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ABSTRACT

RESEARCH OBJECTIVES WERE: (1) TO ESTABLISH NORM DATA FROM A BATTERY OF CREATIVITY TESTS, (2) TO OBTAIN FREQUENCY OF RESPONSE SCORES FOR THE ORIGINALITY SUB-TEST (GUILFORD) TO COMPARE WITH SCORER JUDGMENT TYPE "REMOTE" SCORES, (3) TO PERFORM AN ITEM ANALYSIS, (4) TO ANALYZE AND REPORT ON THE RELATIONSHIP OF CREATIVITY, SOCIO-ECONOMIC STATUS, I.Q., AND SEX WITH VALIDITY OBTAINED FROM A PEER NOMINATION AND INTERESTS AND ACTIVITY INVENTORY; AND (5) TO ANALYZE CONSTRUCT VALIDITY BY FACTOR ANALYSIS. APPROXIMATELY 900 CHILDREN WERE PRE-POST TESTED ON A BATTERY OF TESTS. CONCLUSIONS WERE: (1) THE BATTERY NEEDS REVISION, (2) THE REMOTE JUDGMENT METHOD OF SCORING THE CONSEQUENCE TEST FOR ORIGINALITY IS NOT ACCURATE, (3) ACCEPTABLE INTERNAL CONSISTENCY WAS OBTAINED, (4) CONCURRENT VALIDITY WAS ACCEPTABLE, (5) A SATISFACTORY DEGREE OF CONSTRUCT VALIDITY EXISTED, AND (6) THE GESTALT REDEFINITION TEST, THE ALTERNATE USES TEST, THE SEEING PROBLEMS TEST, AND THE CONSEQUENCES TEST WERE RELIABLE AND VALID. FURTHER STUDIES NEED TO DETERMINE THE EFFECT OF THE TEST SITUATION AND SCORING PROCEDURES UPON CREATIVITY SCORES. (AUTHOR/EK)

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CHAPTER I

INTRODUCTION

Background

Although there have always been philosophical theories dealing with man's creativity, it has only been within the past decade that research psychologists and educators have taken a great interest in identifying creativity and developing tests of creative ability. Pioneering in the development of tests with which to assess the "creative" aspects of the intellect has been J. P. Guilford of the University of Southern California (1956). Although some criticism is voiced regarding such tests of creativity (Thorndike, 1963) subsequent studies by Guilford and others using similar tests seem to substantiate the effectiveness of such tests for at least identifying aspects of the intellect which are different from those commonly measured by standard I.Q. tests (De Boer, 1965; Olshin, 1963; Sherman, 1965). These aspects of the intellect may be called "creativity."

The use of such "creativity" tests has been limited by insufficient data regarding norms and by conflicting and confusing relationships observed between I.Q. levels and obtained creativity test scores. This need for more data regarding pupils tested using these devices has been particularly acute at the elementary school level since most of Guilford's research was with air force cadets, college age and high school subjects.

A revised battery of Guilford's tests was administered to a large group of sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education. This group of approximately 900 students appears to be the largest single group to be tested at this grade level with these tests. The results of this testing were only partially analyzed in the original study and have not been reported beyond the USOE final report (Denny, 1966).

The Problem

The purpose of the present study was to conduct a detailed analysis of the test data obtained from the approximately 900 sixth grade children in central Indiana in 1965-66 using some of the Guilford tests of creativity. It was believed that dissemination of the results of an analysis of these tests would serve as a source of comparison by school personnel should they administer the same or similar tests. Furthermore, it was believed the analysis would also contribute to the basic store of knowledge regarding the "creative" aspects of the intellect, purported to be measured by these tests.

More specifically, the objectives of the study were as follows:

1. To establish norm data from the battery of creativity tests administered to an Indiana population of sixth grade pupils in 1965-66.

2. To obtain frequency of response scores for the originality sub-tests and to compare these scores with scorer judgment type "remote" scores initially obtained. To also examine the type and frequency of response in relation to socio-economic status, sex and I.Q. levels in order to estimate item validity for each level.

3. To perform an item analysis for each item in the battery of tests.

4. To analyze and report on the relationships of measured creativity, socio-economic status, I.Q. and sex, with validity estimates (criterion) obtained from a peer nomination and interest and activity inventory.

5. To analyze construct validity by conducting a factor analysis of the test data.

6. To prepare a report of the results of the analysis together with detailed administration and scoring directions for distribution to interested persons and to publish at least one journal article detailing the results.

CHAPTER II

REVIEW OF RELATED RESEARCH

Although as long ago as 1898 Dearborn investigated the relative independence of intelligence and imagination, it has been during only the last fifteen years that educational research has concentrated its attention on this area (1898). Also during this time there has been a marked increase in articles and books dealing with the topic in more subjective terms. Perhaps the increased interest has been unfortunate for it has resulted in the misconception by the general public and many professional educators that the research on creativity is much more definitive than it actually is. As a matter of fact, much of the research has been poorly designed and unjustifiable conclusions have been drawn (Thorndike, 1963; Skager, 1966).

Relationships to General Intelligence

The critics have pointed out that in a number of studies the restricted range of intelligence of the samples tested has resulted in faulty conclusions about the relationship of intelligence to creativity measures (Wodtke, 1963, 1964; Skager, 1966; Olshin, 1963; Pogue, 1965; Rambo, 1964), yet subsequent research with adequate range has indicated that the aspects measured as "creative" by so-called creativity tests, although positively correlated with measured intelligence, are not highly so (they range from .20 to .41), especially in the group beyond 120 I.Q. (Schwartz, 1965; Sherman, 1965).

A number of studies have attempted to determine if creativity is a psychologically independent entity. Considerable evidence indicates it is not since the criterion variables often used to validate creativity tests are also highly correlated with intelligence measures. Two reasons are proposed for the observed relationship with intelligence (Wallach, 1968). These are, (1) both tests share a common method variance and (2) the definition of creativity is very similar to that for general intelligence. However, it can also be argued that such an attempt to psychologically isolate creativity measures is spurious. It would appear reasonable to assume, as does Guilford, that we are dealing with related yet varied aspects of intellect.

> ... most of the abilities in the structure of the intellect may play appreciable roles in the complete operation of invention. The cognitive abilities are basic. Without having information there is no intellectual performance of any kind. (1962 p. 163)

Another line of attack on the idea of a separate entity for creativity is found in the low positive intercorrelations of creativity tests. It is argued these should be much higher if they are measures of the same entity (Thorndike, 1963).

A conservative conclusion seems to be that there are aspects of the intellect which are not measured by standard intelligence tests, but these are all aspects of a whole and are interrelated. These could be called "creative" aspects of the intellect by virtue of their function. As originally developed through the independent research of Guilford (1956) and Lowenfeld (Lowenfeld and Beittel, 1959) these are defined as fluency, flexibility, sensitivity, originality, and redefinition.

Tests of these "creative" aspects have been developed and have undergone revision by Guilford as well as others (Torrance, 1965). The critics have raised the question of the validity of the tests and the aspects they measure. In reply, Guilford presents a realistic view of the problem involved in determining originality. Since there is no way of knowing whether an idea ever existed before and one would need to know the history of the individual to know whether the idea was new to him, there are two ways left to determine originality empirically. One would be to determine the statistical frequency of a response in a population. The other would be to judge its social usefulness, but here subjectiveness enters the picture. Guilford has used factor-analysis to determine related aspects. The next step would be to determine whether these factors relate to "creative" or "gifted" performance. Guilford's studies have only dealt with the factor-analysis stage.

Subsequent studies, in which Guilford's tests or tests purporting to measure similar aspects of creativity are compared to criterion variables, seem to substantiate their independence of intelligence scores for some children (the high creative - low I.Q.'s) and the positive relationship of intelligence and creativity with a correlation at about the .50 level for children below 120 I.Q. (DeBoer, 1965; Olshin, 1963; Sherman, 1965). High creatives are also found to achieve at a high level on standard achievement tests (DeBoer, 1965; Sherman, 1965). Other studies seem to substantiate Guilford's findings that general creativity is rare and that individuals differ in the kind of creativity (symbolic, verbal, concrete) (1962b). Jones noted this difference when semantic creativity tests were found to be related to writing more than to creative drawing (1961). Bowers' study of fourth, fifth, and sixth grade children also demonstrated differentiated aspects of creativity (1960 pp. 141-142). A pilot study by Rusch, Danny, and Ives indicated the same aspects of "creativity" could be used to design a test for the dramatic arts (1964).

One might safely conclude from the research dealing with the identification of the aspects of the intellect, that these aspects are factors, which differ from intelligence as measured, and which have low positive correlations and thus relate to form factors which are varied in pattern and relationship.

Relationships of Creativity to Socio-economic Status, Sex and Age

Findings often conflict regarding the relationship of creativity scores for differing socio-economic levels. Getzels and Jackson cited different parental attitudes for high-creative, high I.Q. subjects

(1962 pp. 62-74). Ellinger, in a study of 458 fourth grade children in Ohio also found a significant relationship between home environment and creativity as measured by Torrance's Tests (1965). Pogue found no relationship between race and creativity but did note a relationship to socio-economic level (1965). In direct contrast Dever found no significant relationship of creativity and parental attitudes as measured by questionnaires of 100 Negro parents in Texas (1964). Orinstein, in a study of second grade children, also failed to find a significant positive relationship of permissiveness, loving attitudes, and democratic attitudes of parents and their child's creativity (1961). The study might be criticized because of the limited size (N=45) and the measures used. At the junior high level, Rambo also failed to find significant differences between high and low creative pupils in regard to parental occupation, parent's educational level, number of children in the family, child's position in the family, and the parent with whom the child lives (1964).

Perhaps a major reason why these conflicting findings are found relative to socio-economic status is the use of global measures of status. There is logical and empirical evidence to indicate that a break-down of the global nature of socio-economic status to specific aspects would be more fruitful. Guilford (1967 pp. 387-392) suggests such factors as cultural advantages of the home (library, radio and TV, et cetera), attitudes and beliefs of parents, and neighborhood features, are related to intellectual level. Taylor (1964, pp. 99-102) believes such factors as success-orientation, peer-orientation, sanctions against questioning and exploration and the work-play dicotomy are forces which oppose creativeness. A recent study by Wade (1968) appears to lend support to these conclusions as regards the home environment. She feels the unique variance of the creative tests (the variance not overlapping with traditional intelligence measures) is subject to environmental stimulation in a manner not shared by the intelligence measures. More specifically she refers to freedom for fantasy behavior. Supporting evidence for this theory was obtained when creativity tests of fluency, flexibility and originality were administered to 105 tenth grade children in the upper middle class. In both professional and non-professional homes, those in which parents approve TV viewing obtained higher mean creativity scores than those in which TV viewing was not approved.

There is considerable evidence to indicate differences in creativity between the sexes. Torrance (1962 pp. 110-114) cites his own research and that of others indicating emphasis on sex roles caused differential creativity test scores. Guilford (1967 pp. 404-405) lists 17 factors which appear to differentiate between males and females. These factors were compiled from a variety of sources and are only those in which a difference is clearly validated. Of the five factors generally considered creative, females appear to be higher in word, ideational and expressional fluency while boys appear to be higher in the divergent and convergent production of figural transformations. However, there is also evidence of a lack of differentiation in mean scores between the sexes on creativity tests (Yamamoto and Chimbidis, 1966; Yamamoto, 1964). Taylor indicates emphasis on sex roles does not appear to inhibit creativity before the age of 5 years. (1964 pp. 78, 100).

Most authors are agreed that there is substantial evidence to indicate children show less creativity as they grow older, although there is a need for longitudinal studies since many studies have been restricted in range of age (Taylor, 1964 pp. 33, 78-79). Torrance, reporting his own research as well as that of others, shows decrements of creative production at grades 5, 9, and 12 with a peak being reached at about 30 years of age (1962 p. 103; 1965 pp. 107-119). Guilford also indicates evidence that creative production tends to reach its peak at age 30 - 39. There is some variation between occupations which is seemingly related to the amount of preparation necessary to accumulate the basic knowledge with which to be creative (1967 p. 424). The relationship between the socio-economic factors mentioned above and age are quite logical and require further investigation.

Thus it would appear that the relationship between measures of creative and non-creative aspects of the intellect need to be further explored at various age levels. Furthermore, since the relationship of socio-economic status and sex to these measures is not at all clear, the development of age and sex norms and the further exploration of the influence of age, sex, and socio-economic status upon creativity test scores is also desirable. The research reported here is a further step in the direction of the clarification of these relationships.

CHAPTER III

PROCEDURES

The Indiana Study

A revised battery of Guilford's tests was administered to a group of sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education. The tests were administered twice as pre and post measures of creativity in relation to hypotheses relative to teaching behavior related to pupil creative growth (Denny, 1966).

Description of the Sample Tested

Approximately 900 children in 30 classrooms located in four school systems within a 50 mile radius in South-Central Indiana were pre-post tested.* Thirteen classrooms were located in a newly consolidated county-wide school system. Six of these were located in elementary buildings within a municipality and the remaining seven were located in schools which had recently been consolidated. These were typically single buildings housing kindergarten through twelfth grade.

Another school system, similar to the first in that it was a county-wide consolidation, contributed 10 more sixth grade classrooms to the sample. In this case seven of the 10 classrooms were located within the municipality, and the remaining three were located in rural buildings. In none of these cases were the separate buildings a kindergarten through twelfth grade school. All of the buildings had been remodeled to house only elementary grades. The facilities in this school system appeared to be more adequate than in the school system previously described. The classes were not as large, and the buildings and instructional equipment were of a more modern design. This school system evidently had a stronger financial base and had been consolidated a longer period of time than the one previously described. Two classrooms were located in a third school system and were in the same elementary building located within a city. The five remaining classrooms were located in a fourth school system with four of the classrooms in a new, modern elementary building. The remaining classroom was located in a much older elementary building in a socially deprived suburban community.

The sample was not selected as representative of any larger population. However, although not representative of the typical sixth grade population, it may be representative of the sixth grade population in this geographic area.

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* Since absences and incomplete supplementary data influenced the number tested and the available data, the N varies from analysis to analysis.

Table 1 shows the distribution of sex, age, I.Q. and socio-economic status. Socio-economic status was determined using Warner's scale (1949). From this scale a value from one to seven can be assigned which identifies status based on occupation of the child's parents. A score of one is high and seven is low.

The intelligence test scores were obtained from school records. These tests had been administered from two years to two months prior to the time of post-testing. Three intelligence tests were used in these four school systems: the Lorge-Thorndike, the Otis Quick Scoring, and the California Test of Mental Maturity. Although there are difficulties in justifying use of intelligence test scores derived from three different tests, these tests all yield standard deviation I.Q.'s and for this reason the scores were utilized without conversion.

Description of the Test Battery

Although the Guilford tests have been only moderately successful in validation with external criteria (Taylor, 1964, p. 35) they continue to show power to differentiate in factor analytic studies with younger subjects as well as with the adult population (Guilford et. al., 1961; Merrifield, et. al., 1963).

Five basic aspects of creativity have been identified and modified by the research of Guilford. These aspects are Originality, Sensitivity, Fluency, Flexibility and Redefinition (Guilford, 1962 a.). Whether or not the composite score of these tests result in an entity called "creativity" does not appear to be entirely relevant. It is evident, however, that these tests measure unique aspects of the intellect which are not entirely measured by the usual intelligence tests.

A battery of tests designed to measure these five aspects of creativity were developed from those of Guilford's. The battery was initially developed in a pilot study with sixth grade children conducted in New York state during the 1964-65 academic year. The tests, as developed, were essentially the same as those used by Guilford. Revisions usually consisted of minor changes in wording to make them more understandable for sixth grade children. In some cases the number of sub-test items was reduced from those in the original. There were also a few changes in the administration of the tests and in the detail of the directions and examples given which were worked out during this pilot study. Since the tests are copyrighted it is not possible to include them in this publication. However, each aspect of creativity measured by the tests and descriptions of the type of test items is provided in Appendix B.

Administration and Scoring Procedures

Administration. The investigator administered all of the pre-tests and post-tests. Use of a single, trained person to administer the tests was believed to be especially important when using a test battery of this type, in which the attitude and motivation of the pupil is influential. By having one person administer all of the tests, consistency was obtained. The pupils were briefly enlightened as to the purpose of the tests and the study. They were told that the tests would be different from their usual

TABLE 1. DISTRIBUTION OF SEX, IQ, SOCIO-ECONOMIC STATUS, PEER NOMINATION AND ACTIVITY INVENTORY SCORES IN THE POPULATION.*

S-E Status		IQ		Sex		Peer Nomination	Activity Inventory
Level	N	Level	N				
1	41	90-	134	Males	464	X=5.22	X=28.40
2	54	91-119	529	Females	433	SD=6.32	SD=15.34
3	103	120+	153	Total	897	N=566	N=776
4	120	Total	816				
5	260	X=105.63					
6	231	SD=15.08					
7	84	N=778					
Total	893						
X=105.63							
SD=15.08							
N=778							

* Different N's are the result of incomplete data for all cases.

classroom tests and that they would find them fun and something for which they would not need to prepare. They were further cautioned to do their best and were encouraged to employ their original ideas and not to be concerned with handwriting, correct spelling, or proper sentence structure. Every effort was made to build a positive rapport with the class prior to the administration of the tests. There were many evidences that such a rapport was established.

The pre-test was administered in October, the post-test in April. One hour was required for administration of the battery, including the giving of directions.

Alternate forms of the test battery were not available. Since approximately six months intervened between the pre-testing and post-testing, the use of the same form for the post-tests was not considered to be detrimental. There were no evidences of pupil recall of items. The teachers were allowed to remain in the room during the pre-testing and to examine a copy of the test, however a copy was not left with them and they were cautioned not to discuss the test with the children.

Scoring. The tests were scored by four research assistants who had received training for this purpose. This was necessary since only the Gestalt Transformation test was of an objective type. The remaining tests required the student to write out a response which required some judgment on the part of the scorer. Although, in order to establish reliability coefficients, two persons were trained and compared in their scoring for a given test in the battery, in most cases only one person scored a given test for all classrooms for both pre-testing and post-testing. This was done to provide consistency in scoring. Scoring procedures provided by the publisher and by Guilford were used and revised where necessary.

Analysis Procedures

The objectives of the study were accomplished in two phases: those dealing with the further analysis and development of the test battery; and analysis concerned with exploring relationships of creativity with other variables for the population tested.

The establishment of norm data. Means, standard deviations, minimum and maximum scores were computed for the total population and for sub-divisions of sex, I.Q., socio-economic levels and age. These computations were for both pre and post test data. Differences between levels were examined using the t test. Tables of percentile rank and score for the total sample for each sub-test and total battery scores were also computed.

Development of frequency scoring for originality. The originality test was initially scored by trained persons on the basis of detailed directions which discriminated between remote and obvious responses. This was a procedure suggested by Guilford (1959). He points out, however, that this is only one way of determining originality. Another is to ascertain uncommonness of response (statistically infrequent in a given population). There have been no published comparisons of both methods of evaluating originality.

The responses on the post-test consequences questions, previously scored remote or obvious, were listed and coded on IBM cards. These responses were then counted and the frequency of occurrence was used to derive a score. The score consisted of the total number responding minus the frequency of the particular response. Thus, the more frequent the response the lower the score. This procedure is less stringent than that of Wallach and Kogan who considered only the single frequency responses as being original (1965). In the present study originality was considered to be a continuum in which the unique response received the highest score but the response occuring only a few times in the total population also received some credit.

The responses given for each question and their frequencies are reported in Appendix A.

Additionally, the responses were compared to see if there were meaningful differences in frequency and type of response for boys and girls, levels of I.Q. and socio-economic status. The chi-square test was used to select significantly different frequencies of response between levels. This was done in those cases in which ten or more identical responses were registered. The content of the responses was then compared to try to determine reasons for the differences.

Validity and reliability. Estimates of reliability of the tests were obtained by the intercorrelation of items and by test-retest and split-half coefficients for the total test and its sub-tests. A further index of reliability (objectivity) was obtained by examination of scorer agreement when using the directions for arriving at scores for each sub-test.

Two types of validity were examined. Concurrent validity was estimated by determining relationships of the test items, sub-tests and total test scores with two independent measures of creativity. Peer nomination was obtained by administering a questionnaire called "Who Does It?" The students were asked to respond with the name of the boy or girl in the class who would most likely "make up a new game, solve a problem at recess," etc. The questions were designed to indicate creative persons. The students in each class were assigned a score consisting of the total number of nominations received. A questionnaire was also administered to determine which students participated in independent activities considered to be creative in nature. A list of 100 activities called "Things Done On Your Own" was presented and each student was instructed to check those he had participated in during the school year. He was directed to only list those he had done on his own; not those he had been required to do by his teachers, parents, or others. Each student's score was the total number of activities checked. Both of these devices had previously been shown to hold a limited degree of validity (Taylor, 1964, pp. 41-45; Yamamoto, 1964).

Construct validity was estimated by factor analyzing the test data to see if the items resulted in each of the factors which Guilford had previously identified with these items (Merrifield, Guilford, and Gershen, 1963; Guilford, Merrifield and Cox, 1961).

Item analysis. The intercorrelation of items with sub-test and total test scores and correlation with the criterion measures of peer nomination and interest inventory scores was examined to indicate overlap of items, item validity and reliability.

CHAPTER IV

FINDINGS

Norm Data

The Total Population. Tables 2 through 10 present means, standard deviations, minimum and maximum scores for the total population and for sub-divisions of sex, I.Q., socio-economic status and age.

Table 2 presents data for the total population on both pre and post testings. It will immediately be noted that the lower limit of the sub-tests was too high in that the minimum score was zero in all cases. It will also be noted that in the case of Originality-Clever and Originality-Remote the scores were skewed. This should be considered in interpreting other data to be presented relative to the Originality variable in this report.

Sex Differences. In Tables 3 and 4 the same data is presented sub-divided by sex. Table 3 presents pre-test data and Table 4 presents post-test data. The t test was used to compare the mean difference between males and females for each sub-test and the total score. It will be noted that on both pre and post tests the females had a significantly higher total mean score ($p < .01$) than did the males. It is interesting to note that the females also had significantly higher mean scores than did the males on a number of the sub-tests with the exception of the Redefinition test on which the males mean score was significantly higher ($p < .05$ on the pre-test and $p < .01$ on the post-test). This may be a factor of the test content and format. It will be noted later on in this report that the item content for the Gestalt Redefinition Test appears to pertain to the mechanical interests of the male. It will also be noted in Tables 23 and 24 that the Redefinition items do not have as high a correlation with the other items of the test, indicating a dissimilar test. It is not possible to say from this analysis that girls tend to exhibit more creativity than boys or whether it is a case of the test being biased for girls. At any rate, those using the test would do well to use separate norms for girls and boys.

Intelligence Level Differences. Tables 5 and 6 report data for pre and post tests sub-divided by I.Q. levels. Level 1 is defined as I.Q. of 90 (N=127) and below; Level 2 is defined as I.Q. of 91-119 (N=501) and Level 3 is I.Q. of 120+ (N=146). In all cases (pre and post) for all sub-tests and total score there were mean differences between levels of I.Q. significantly greater than the .01 level of confidence. In all cases the higher I.Q. level had a significantly higher mean creativity test score. This finding reflects the correlation of .61 for post-test total score and I.Q. as reported in Table 24. The test user will thus obviously also need to consider I.Q. level when interpreting the creativity test scores.

TABLE 2. PRE AND POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES *

Variable	$\bar{X}$	SD	Max.	Min.
Redefinition	5.51	2.64	15	0
Flexibility	5.57	3.98	22	0
Originality-Clever	.72	1.51	12	0
Sensitivity	15.24	5.39	30	0
Originality-Remote	1.03	1.45	13	0
Fluency	8.33	4.18	29	0
Total-Pretest	36.59	13.56	88	4
Redefinition	7.06	3.04	15	0
Flexibility	8.85	4.58	23	0
Originality-Clever	1.45	2.11	14	0
Sensitivity	16.95	5.46	30	0
Originality-Remote	2.50	2.37	14	0
Fluency	11.05	4.94	27	0
Total-Post-test	47.90	16.74	93	3

* N = 898 Pre-test, 896 Post-test.

TABLE 3. PRE-TEST MEANS, STANDARD DEVIATIONS
MAXIMUM AND MINIMUM SCORES BY SEX

Variable	Sex	$\bar{X}$	SD	Max.	Min.	t
Redef.	M	5.66	2.84	15	0	2.57*
	F	5.36	2.42	13	0	
Flex.	M	5.74	3.89	22	0	.49
	F	5.81	4.06	22	0	
Orig.C.	M	.76	1.54	12	0	1.02
	F	.67	1.48	8	0	
Sensi.	M	14.55	5.25	29	0	8.48**
	F	15.96	5.44	30	0	
Orig.R.	M	.97	1.36	9	0	1.39
	F	1.09	1.53	13	0	
Flu.	M	7.75	4.01	22	0	7.93**
	F	8.91	4.28	29	0	
Total	M	35.52	13.38	88	4	8.21**
	F	37.69	13.67	83	4	

N = Males = 392; females = 382

* Significant at .05 level
** Significant at .01 level

TABLE 4. POST-TEST MEANS, STANDARD DEVIATIONS MAXIMUM AND MINIMUM SCORES BY SEX

Variable	Sex	$\overline{X}$	SD	Max.	Min.	t
Redef.	M	7.36	3.03	15	0	4.88**
	F	6.75	3.01	15	0	
Flex.	M	8.99	4.35	21	0	1.82
	F	8.71	4.80	23	0	
Orig.C.	M	1.49	2.12	14	0	.86
	F	1.40	2.11	10	0	
Sensi.	M	16.40	5.34	29	0	6.75**
	F	17.53	5.52	30	0	
Orig.R.	M	2.38	2.29	12	0	2.17*
	F	2.62	2.44	14	0	
Flu.	M	10.49	4.86	27	0	7.10**
	F	11.62	4.95	27	0	
Total	M	47.09	16.47	93	4	5.58**
	F	48.73	17.00	93	3	

N = Males = 392; females = 382

* Significant at .05 level
** Significant at .01 level

TABLE 5. PRE-TEST MEANS, STANDARD DEVIATIONS MAXIMUM AND MINIMUM SCORES BY IQ

Variable	IQ Level #	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{2,3}$	$t_{1,3}$
Redef.	1	3.92	2.11	10	0	10.09	10.61	16.40
	2	5.47	2.46	15	0			
	3	7.06	2.82	13	1			
Flex.	1	2.80	2.95	13	0	15.62	16.15	25.75
	2	5.70	3.63	22	0			
	3	8.62	3.92	22	0			
Orig.C.	1	.25	.76	4	0	3.00	8.72	9.04
	2	.58	1.34	10	0			
	3	1.59	2.13	12	0			
Sensi.	1	11.82	5.38	24	0	16.28	9.36	20.19
	2	15.47	5.02	29	0			
	3	17.45	5.20	30	1			
Orig.R.	1	.57	1.00	6	0	3.71	4.62	6.86
	2	1.00	1.45	13	0			
	3	1.53	1.62	9	0			
Flu.	1	5.43	3.75	18	0	15.48	9.78	20.59
	2	8.48	3.98	29	0			
	3	10.31	3.87	22	2			
Total	1	24.87	11.24	57	4	34.51	30.18	51.70
	2	36.66	11.97	88	7			
	3	46.53	12.51	80	16			

#IQ Levels: 1 = 90, N = 127
2 = 91-119, N = 501
3 = 120+, N = 146

$P < .05$ $t = 1.96$
$P < .01$ $t = 2.58$

TABLE 6 . POST-TEST MEANS, STANDARD DEVIATIONS MAXIMUM AND MINIMUM SCORES BY IQ

Variable	IQ Level#	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{2,3}$	$t_{1,3}$
Redef.	1	5.17	2.42	12	0	10.58	14.60	20.31
	2	6.91	2.82	15	0			
	3	9.23	2.97	15	2			
Flex.	1	5.21	4.08	16	0	17.73	19.16	29.12
	2	8.75	4.03	20	0			
	3	12.38	4.15	23	3			
Orig.C.	1	.50	1.33	8	0	5.85	12.03	13.70
	2	1.27	1.86	8	0			
	3	2.89	2.71	14	0			
Sensi.	1	13.43	5.71	27	0	15.59	14.78	23.91
	2	16.95	5.03	30	2			
	3	20.05	4.77	30	7			
Orig.R.	1	1.13	1.43	8	0	8.77	11.73	17.05
	2	2.39	2.26	12	0			
	3	4.07	2.53	14	0			
Flu.	1	7.29	3.99	21	0	18.10	16.16	27.27
	2	11.05	4.47	24	0			
	3	14.30	4.92	27	4			
Total	1	32.73	14.11	79	3	39.39	44.29	65.51
	2	47.35	13.92	91	14			
	3	63.01	14.86	93	27			

#IQ Levels: 1 = 90, N = 127
2 = 91-119, N = 501
3 = 120+, N = 146

$P < .05$ $t = 1.96$
$P < .01$ $t = 2.58$

Age Differences. Tables 7 and 8 report test data sub-divided by four levels of age. Level 1 was 10 years of age or less (N=57), Level 2 was age 11 (N=563), Level 3 was 12 years (N=115) and Level 4 was 13 years or more (N=39). As in the previous analysis, the means of each level were compared to determine if there were significant differences between levels. Although differences were not always significant, inspection of these tables reveals a direction of differences in keeping with the theory that as children become older they become less creative. In all cases the older levels had lower mean sub-test and total test scores than did the younger students. In some cases the 10 years or below group had significantly lower mean scores than did the 11 year old group but the age 10 and below group still had a higher mean score than the 12 and 13+ group. Caution, however, should be used in interpreting seeming differences between age levels. These differences may actually be due to differences in I.Q. level since age 13+ is rare for the normal sixth grade child one would expect such students to be the less intelligent repeaters. Also, since age 10 or below is low for grade six most of these students are undoubtedly from the two classes which were 5th-6th combination grades and the school location may be the relevant factor in this case.

Socio-economic Level Differences. The data was further analyzed by levels of socio-economic status as established by Warner's ranking of parental occupation (Tables 9 and 10). In this system a rank of 1 is high and 7 low. In this analysis levels 1 and 2 were combined as were levels 6 and 7 in order to obtain larger N's at these extremes. Thus the level 1 represents higher executives of large concerns, proprietors (larger stores), major professionals, business managers, and lesser professionals (N=86). Level 2 represents administrative personnel, owners of small businesses (e.g. beauty shop), farmers, and minor professionals (N=93). Level 3 represents clerical and sales workers, technicians, and owners of little businesses (e.g. newsstand) (N=104). Level 4 includes skilled manual employees and small farmers and tenant farmers (N=229). Level 5 includes machine operators, semi-skilled employees, and unskilled employees (N=262).

For total mean scores on both pre and post tests the differences between all levels were significant at the .01 level. The higher socio-economic levels had higher mean scores than the lower socio-economic levels. One would suspect this is indicative of a general bias of the written test and content of all items toward the upper socio-economic level student. Supporting this conclusion is the fact that the relationship of higher means for higher socio-economic levels was consistent for all items for the test battery, thus ruling out the possible inappropriateness of particular items. It is also noted that socio-economic status correlated at .33 with I.Q. for the total population (N=778) and only .22 and .28 with the pre and post test total creativity scores. Knowing the relationship of socio-economic status to non-culture free tests of intelligence such as those used in this study, would lead one to conclude that seeming relationships of socio-economic status to creativity were the function of the relationship of socio-economic status to I.Q. Indeed, the partial correlation of status to post-test creativity when I.Q. is held constant is reduced to .11.* This is a net variance reduction of 6.6 percent. However, the user of

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* Partial correlation estimated using a nomograph.

TABLE 7. PRE-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY AGE

Variable	Age	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Redef.	1 - 10	4.63	1.91	9	1	5.33**	.80	1.19	5.98**	5.74**	1.89
	2 11	5.83	2.69	15	0						
	3 12	4.83	2.57	11	0						
	4 13+	4.28	2.18	9	1						
Flex.	1 - 10	5.12	3.85	17	0	4.67**	3.87**	5.59**	12.28**	10.59**	2.95**
	2 11	6.41	3.96	22	0						
	3 12	3.94	3.38	12	0						
	4 13+	2.95	2.95	10	0						
Orig.C.	1 - 10	.18	.68	4	0	4.01**	1.27	.18	4.01**	3.20**	.93
	2 11	.88	1.67	12	0						
	3 12	.37	.94	4	0						
	4 13	.21	.61	2	0						
Sensi.	1 - 10	14.77	4.70	25	1	4.18**	4.30**	10.28**	12.46**	16.20**	7.36**
	2 11	16.08	5.12	30	0						
	3 12	13.18	5.45	26	2						
	4 13+	10.00	5.41	21	0						
Orig.R.	1 - 10	.60	1.08	5	0	3.19**	1.90	.88	1.37	3.62**	2.51*
	2 11	1.13	1.47	13	0						
	3 12	.96	1.50	9	0						
	4 13+	.41	1.09	6	0						

TABLE 7. CONTINUED

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Flu.	1 - 10	7.46	3.63	16	1	5.65**	2.48*	7.98**	11.50**	14.37**	6.54**
	2 11	9.03	4.03	29	0						
	3 12	6.67	3.99	19	0						
	4 13+	4.26	3.86	18	0						
Total	1 - 10	32.74	9.81	55	10	13.29**	5.05**	15.75**	25.48**	28.92**	12.13**
	2 11	39.34	13.05	88	7						
	3 12	29.96	12.41	65	4						
	4 13+	22.10	11.67	49	4						

N: 1=57; 2=563; 3=115; 4=39

* Significant at .05 level
** Significant at .01 level

TABLE 8. POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY AGE

Variable	Age	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Redef.	1 - 10	5.79	2.44	12	1	7.32**	.69	2.13*	8.93**	8.53**	2.90**
	2 11	7.55	3.05	15	0						
	3 12	5.97	2.69	14	0						
	4 13+	5.10	2.40	11	1						
Flex.	1 - 10	8.12	4.05	19	0	5.31**	5.03**	7.09**	14.93**	13.03**	3.55**
	2 11	9.67	4.44	23	0						
	3 12	6.47	4.13	17	0						
	4 13+	5.13	4.22	14	0						
Orig.C.	1 - 10	.98	1.47	6	0	3.46**	.78	2.22*	5.80**	5.04**	1.59
	2 11	1.69	2.25	14	0						
	3 12	.82	1.67	6	0						
	4 13+	.46	.97	4	0						
Sensi.	1 - 10	16.54	4.58	27	7	4.16**	5.80**	9.52**	14.59**	15.39**	5.68**
	2 11	17.85	5.20	30	2						
	3 12	14.45	5.13	26	2						
	4 13+	12.00	6.27	24	0						
Orig.R.	1 - 10	2.37	2.26	10	0	2.09*	3.24**	6.03**	7.77**	8.26**	3.48**
	2 11	2.82	2.41	14	0						
	3 12	1.60	2.09	12	0						
	4 13+	.74	.85	3	0						

TABLE 8. CONTINUED

Variable	Age	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{2,3}$	$t_{2,4}$	$t_{3,4}$
Flu.	1 - 10	11.58	4.22	22	3	1.09	9.30**	15.33**	15.55**	17.93**	8.01**
	2 11	11.91	4.80	27	2						
	3 12	8.45	4.36	23	0						
	4 13+	5.49	2.82	10	0						
Total	1 - 10	45.35	13.53	82	22	11.18**	12.48**	21.32**	34.12**	34.44**	12.58**
	2 11	51.55	15.86	93	14						
	3 12	37.75	14.43	79	6						
	4 13+	28.92	14.09	58	3						

N: 1=57; 2=563; 3=115; 4=39

* Significant at .05 level
** Significant at .01 level

TABLE 9. PRE-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY LEVELS OF SOCIO-ECONOMIC STATUS #

Test	Level	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Redef.	1	6.33	2.81	13	1	.78	1.92	4.51**	6.73**	1.21*	3.77**	6.04**	2.41*	4.65**	2.70**
	2	6.14	2.46	14	1										
	3	5.86	2.81	15	0										
	4	5.39	2.68	13	0										
	5	5.00	2.44	12	0										
Flex.	1	7.44	3.85	22	0	4.61**	2.89**	7.42**	10.17**	1.75	2.26*	4.88**	4.35**	7.13**	3.29**
	2	6.11	3.59	15	0										
	3	6.60	4.10	20	0										
	4	5.56	4.07	21	0										
	5	4.97	3.81	22	0										
Orig.C.	1	1.12	1.52	6	0	2.81**	1.59	2.41*	3.81**	1.22	.71	.43	.66	1.95	1.53
	2	.62	1.32	6	0										
	3	.83	1.59	8	0										
	4	.73	1.68	10	0										
	5	.56	1.36	12	0										
Sensi.	1	16.34	5.27	28	1	.24	1.84	3.52**	7.14**	1.70	3.42**	7.22**	1.54	5.33**	4.71**
	2	16.26	4.41	29	5										
	3	15.72	5.41	28	1										
	4	15.29	5.67	30	0										
	5	14.29	5.35	28	2										
Orig.R.	1	1.22	1.48	7	0	.28	.00	1.83	2.04*	.29	1.56	1.76	1.94	2.16*	.19
	2	1.17	1.41	6	0										
	3	1.22	1.60	9	0										
	4	.94	1.45	13	0										
	5	.92	1.37	9	0										

TABLE 9. CONTINUED

Test	Level	$\bar{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Flu.	1	9.86	4.36	19	2										
	2	9.98	3.99	22	1										
	3	8.70	3.86	20	1	.39	3.94**	7.86**	9.23**	4.53**	8.67**	10.11**	3.69**	5.05**	1.58
	4	7.82	4.15	29	0										
	5	7.53	4.05	22	0										
Total	1	42.30	13.11	76	18										
	2	40.31	11.44	68	12										
	3	38.88	13.43	80	10	3.80**	6.43**	14.42**	19.80**	2.84*	10.67**	16.09**	7.63**	13.01**	6.32**
	4	35.52	14.09	83	4										
	5	33.42	13.00	88	4										

N= SE level: 1=86; 2=93; 3=104; 4=229; 5=262

#Socio-economic status determined using Warner's Scale. 1 is high and 5 is low.

* Significant at .05 level
** Significant at .01 level

TABLE 10. POST-TEST MEANS, STANDARD DEVIATIONS, MAXIMUM AND MINIMUM SCORES BY LEVELS OF SOCIO-ECONOMIC STATUS#

Test	Level	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Redef.	1	7.88	3.24	14	1	1.04	2.13*	3.68**	6.54**	1.05	2.51*	5.37**	1.40	4.33**	3.54**
	2	7.60	3.21	15	2										
	3	7.34	2.86	14	0										
	4	7.05	3.15	15	1										
	5	6.50	2.77	15	0										
Flex.	1	11.81	4.48	21	2	6.37**	7.03**	12.33**	16.60**	.59	4.80**	9.17**	4.22**	8.75**	5.86**
	2	9.80	4.42	23	0										
	3	9.62	4.65	21	0										
	4	8.58	4.22	19	0										
	5	7.48	4.38	20	0										
Orig.C.	1	2.00	2.08	8	0	.51	1.36	3.26**	5.36**	.86	2.73**	4.86**	1.79	3.97**	2.69**
	2	1.89	2.13	10	0										
	3	1.71	2.17	10	0										
	4	1.40	2.13	8	0										
	5	1.05	2.02	14	0										
Sensi.	1	18.37	4.74	30	4	.58	2.60*	5.77**	8.39**	3.24**	6.58*	9.28**	3.18**	5.92**	3.29**
	2	18.56	4.93	30	6										
	3	17.54	4.82	26	5										
	4	16.66	5.76	30	0										
	5	15.95	5.60	30	0										
Orig.R.	1	3.29	2.21	11	0	.48	1.25*	5.17**	7.47**	.77	4.64*	6.90**	3.78**	5.99**	2.41*
	2	3.18	2.55	12	0										
	3	3.00	2.82	14	0										
	4	2.29	2.39	11	0										
	5	1.97	1.96	9	0										

TABLE 10. CONTINUED

Test	Level	$\overline{X}$	SD	Max.	Min.	$t_{1,2}$	$t_{1,3}$	$t_{1,4}$	$t_{1,5}$	$t_{2,3}$	$t_{2,4}$	$t_{2,5}$	$t_{3,4}$	$t_{3,5}$	$t_{4,5}$
Flu.	1	13.03	4.70	23	5										
	2	12.73	4.67	23	3										
	3	11.54	5.26	26	1	.93	4.57**	8.24**	11.80**	3.74**	7.38**	10.99**	3.08**	6.53**	4.21**
	4	10.72	5.00	27	0										
	5	9.89	4.55	23	0										
Total	1	56.27	15.23	89	24										
	2	54.34	16.06	91	16										
	3	50.87	16.37	93	23	3.26**	9.30**	18.75**	27.61**	6.04**	15.31**	24.20**	8.69**	17.60**	10.79**
	4	46.68	16.77	93	3										
	5	42.76	15.59	90	4										

N= SE level: 1=86; 2=93; 3=104; 4=229; 5=262

#Socio-economic status determined using Warner's Scale. 1 is high and 5 is low.

* Significant at .05 level
** Significant at .01 level

TABLE **11.** STANDARD SCORES AND CENTILES FOR TOTALS
PRE-POST TESTS

Raw Score	Pre-test Standard Scores	Centile	Post-tests Standard Scores	Centile
1	23.754	.001	21.984	.001
2	24.492	.001	22.581	.001
3	25.229	.001	23.178	.001
4	25.966	.002	23.775	.002
5	26.704	.004	24.373	.004
6	27.441	.007	24.970	.006
7	28.178	.009	25.568	.006
8	28.916	.014	26.165	.007
9	29.653	.019	26.762	.008
10	30.391	.021	27.360	.008
11	31.128	.022	27.957	.009
12	31.866	.023	28.554	.011
13	32.603	.029	29.152	.013
14	33.341	.039	29.749	.017
15	34.078	.048	30.346	.020
16	34.816	.056	30.944	.024
17	35.553	.062	31.541	.029
18	36.291	.072	32.139	.031
19	37.028	.088	32.736	.034
20	37.765	.105	33.333	.038
21	38.503	.125	33.931	.045
22	39.240	.147	34.528	.054
23	39.978	.168	35.125	.064

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
24	40.715	.192	35.723	.075
25	41.453	.215	36.320	.091
26	42.190	.234	36.918	.102
27	42.928	.257	37.515	.109
28	43.665	.283	38.112	.120
29	44.403	.311	38.710	.134
30	45.140	.338	39.307	.152
31	45.878	.362	39.904	.167
32	46.615	.389	40.502	.180
33	47.353	.424	41.099	.192
34	48.090	.463	41.697	.206
35	48.827	.494	42.294	.222
36	49.565	.524	42.891	.244
37	50.302	.562	43.489	.269
38	51.040	.594	44.086	.288
39	51.777	.615	44.683	.311
40	52.515	.636	45.281	.334
41	53.252	.657	45.878	.358
42	53.990	.679	46.476	.386
43	54.727	.705	47.073	.410
44	55.465	.726	47.670	.433
45	56.202	.749	48.268	.461
46	56.940	.774	48.865	.486

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
47	57.677	.795	49.462	.507
48	58.414	.812	50.060	.533
49	59.152	.828	50.657	.562
50	59.889	.846	51.254	.585
51	60.627	.862	51.852	.603
52	61.364	.876	52.449	.626
53	62.102	.888	53.047	.651
54	62.839	.901	53.644	.670
55	63.577	.912	54.241	.688
56	64.314	.921	54.839	.709
57	65.052	.928	55.436	.729
58	65.789	.936	56.033	.751
59	66.527	.946	56.631	.767
60	67.264	.953	57.228	.780
61	68.001	.959	57.826	.795
62	68.739	.966	58.423	.809
63	69.476	.968	59.020	.821
64	70.214	.971	59.618	.834
65	70.951	.976	60.215	.848
66	71.689	.983	60.812	.859
67	72.426	.988	61.410	.871
68	73.164	.989	62.007	.883
69	73.901	.990	62.605	.891

TOTALS (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
70	74.639	.991	63.202	.900
71	75.376	.991	63.799	.913
72	76.114	.992	64.397	.923
73	76.851	.992	64.994	.929
74	77.588	.993	65.591	.935
75	78.326	.994	66.189	.940
76	79.063	.995	66.786	.946
77	79.801	.996	67.384	.952
78	80.538	.996	67.981	.956
79	81.276	.996	68.578	.960
80	82.013	.997	69.176	.965
81	82.751	.997	69.773	.967
82	83.488	.997	70.370	.970
83	84.226	.998	70.968	.974
84	84.963	.998	71.565	.977
85	85.701	.998	72.162	.980
86	86.438	.998	72.760	.983
87	87.176	.998	73.357	.985
88	87.913	.999	73.955	.987
89	88.650	.999	74.552	.989
90	89.387	.999	75.149	.991
91	90.125	.999	75.747	.994
92	90.862	.999	76.344	.997
93	91.600	.999	76.941	.999

TABLE 12. STANDARD SCORES AND CENTILES FOR FLUENCY PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	32.464	.025	29.656	.009
2	34.856	.054	31.680	.016
3	37.249	.096	33.704	.034
4	39.641	.154	35.729	.064
5	42.033	.225	37.753	.099
6	44.426	.308	39.777	.151
7	46.818	.414	41.802	.219
8	49.211	.519	43.826	.292
9	51.603	.607	45.850	.359
10	53.995	.692	47.874	.452
11	56.388	.766	49.899	.538
12	58.780	.823	51.923	.615
13	61.172	.862	53.947	.680
14	63.565	.900	55.972	.743
15	65.957	.934	57.996	.797
16	68.349	.958	60.020	.838
17	70.742	.972	62.045	.873
18	73.134	.983	64.069	.904
19	75.526	.991	66.093	.927
20	77.919	.994	68.117	.947
21	80.311	.995	70.142	.967
22	82.703	.997	72.166	.980
23	85.096	.997	74.190	.988
24	87.488	.997	76.215	.992
25	89.880	.997	78.239	.994

FLUENCY (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
26	92.273	.998	80.263	.996
27	94.665	.998	82.287	.999
28	97.057	.998	84.311	.999
29	99.450	.999	86.336	.999

TABLE 13. STANDARD SCORES AND CENTILES FOR FLEXIBILITY PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	38.518	.136	32.860	.047
2	41.030	.212	35.044	.077
3	43.543	.291	37.227	.112
4	46.055	.377	39.410	.158
5	48.568	.463	41.594	.216
6	51.080	.555	43.777	.290
7	53.593	.655	45.961	.377
8	56.106	.737	48.144	.460
9	58.618	.804	50.327	.532
10	61.131	.864	52.511	.613
11	63.643	.910	54.694	.702
12	66.156	.939	56.878	.774
13	68.668	.958	59.061	.829
14	71.181	.972	61.245	.866
15	73.693	.981	63.428	.899
16	76.206	.988	65.611	.931
17	78.719	.993	67.795	.957
18	81.231	.994	69.978	.974
19	83.744	.995	72.162	.984
20	86.256	.996	74.345	.992
21	88.769	.997	76.528	.997
22	91.281	.999	78.712	.998
23	93.794	.999	80.895	.999

TABLE 14. STANDARD SCORES AND CENTILES FOR REDEFINITION PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	32.917	.031	30.066	.009
2	36.705	.093	33.355	.029
3	40.492	.193	36.645	.078
4	44.280	.318	39.934	.170
5	48.068	.458	43.224	.298
6	51.856	.604	46.513	.438
7	55.644	.741	49.803	.565
8	59.432	.839	53.092	.675
9	63.220	.899	56.382	.767
10	67.008	.938	59.671	.844
11	70.795	.963	62.961	.900
12	74.583	.982	66.250	.936
13	78.371	.993	69.539	.966
14	82.159	.997	72.829	.988
15	85.947	.999	76.118	.997

TABLE 15. STANDARD SCORES AND CENTILES FOR ORIGINALITY-CLEVER PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
2	58.477	.847	52.607	.696
4	71.722	.952	62.085	.863
6	84.967	.986	71.564	.948
8	98.212	.994	81.043	.987
10	111.457	.998	90.521	.998
12	124.702	.999	100.000	.998
14	137.947	.999	109.479	.999

TABLE 16. STANDARD SCORES AND CENTILES FOR ORIGINALITY-REMOTE PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	49.793	.608	43.671	.324
2	56.690	.813	47.890	.511
3	63.586	.911	52.110	.659
4	70.483	.954	56.329	.780
5	77.379	.978	60.549	.865
6	84.276	.988	64.768	.918
7	91.172	.993	68.987	.945
8	98.069	.995	73.207	.961
9	104.966	.997	77.426	.981
10	111.862	.997	81.646	.990
11	118.759	.998	85.865	.994
12	125.655	.998	90.084	.998
13	132.552	.999	94.304	.998
14	139.440	.999	98.523	.999

TABLE 17. STANDARD SCORES AND CENTILES FOR SENSITIVITY PRE-POST TESTS

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
1	23.581	.007	20.788	.006
2	25.436	.011	22.619	.008
3	27.291	.018	24.451	.011
4	29.147	.026	26.282	.016
5	31.002	.031	28.114	.022
6	32.857	.046	29.945	.030
7	34.712	.064	31.777	.038
8	36.568	.085	33.608	.049
9	38.423	.122	35.440	.073
10	40.278	.172	37.271	.104
11	42.134	.228	39.103	.140
12	43.989	.290	40.934	.184
13	45.844	.358	42.766	.236
14	47.699	.424	44.597	.299
15	49.555	.488	46.429	.375
16	51.410	.559	48.260	.449
17	53.265	.630	50.092	.513
18	55.121	.696	51.923	.574
19	56.976	.757	53.755	.631
20	58.831	.812	55.586	.690
21	60.686	.853	57.418	.746
22	62.542	.891	59.249	.794
23	64.397	.924	61.081	.843

SENSITIVITY (continued)

Raw Score	Pre-test Standard Score	Centile	Post-tests Standard Score	Centile
24	66.252	.950	62.912	.893
25	68.108	.967	64.744	.930
26	69.963	.979	66.575	.955
27	71.818	.988	68.407	.975
28	73.673	.994	70.238	.986
29	75.529	.998	72.070	.991
30	77.384	.999	73.901	.997

these tests would do well to consider socio-economic status of his students when using the norm data.

Standard Scores and Centiles. Tables 11 through 17 present standard scores and centiles for each sub-test and total score computed from the pre and post test.

Frequency Scoring of the Consequences Test

The Two Methods Compared. The correlation of the remote-judgment method of scoring the Consequences Tests with the frequency of response method was .436 (N=755). This correlation is surprisingly low for a supposedly alternate method of measuring an entity known as "originality". However, the degree of correlation has undoubtedly been attenuated by imperfect reliability of each procedure (Guilford, 1965, p. 486). Table 18 presents the intercorrelations of the tests scored using the frequency procedure. Table 23 shows the intercorrelations of all test items for a random sample of 124 post-tests. The average intercorrelation of items 1 and 2 and items 3 and 4 of the Consequences Test scored using the frequency method is .366. The intercorrelations of these items using the remote method is .433. This would indicate comparable items in spite of the method of scoring used.

A distinct advantage of the frequency of response method of scoring the Consequences Test for Originality is the increased objectivity. There are only minimal judgments necessary such as deciding if different wording implies different meaning or is equivalent to another response. No judgments of the remoteness or obviousness of a response are called for. Thus, another interesting interpretation of the low correlation of these two scoring methods is that the remoteness score may be more of a measure of the frequency of a response in the experience of the scorer population rather than the frequency in the population of subjects taking the test.

Appendix A of this report contains a listing of all responses for each item and their frequency. The researcher interested in comparing responses for other populations may find this valuable.

Table 19 presents the mean scores and standard deviations for each item using the frequency method.

Differences in response by Sex, I.Q., and Socio-economic Status. Responses made by ten or more persons (less original responses) were examined to see if significant differences in types of response were evident between the sexes, I.Q. level, and between levels of socio-economic status. Only responses occuring ten or more times and differing significantly ($p < .05$) in frequencies between levels using the Chi-square test of difference were examined. Tables 20, 21 and 22 contain these significantly different responses and related Chi-square values. The four questions for each of the items were as follows:

1. What would be the results if none of us needed food any more in order to live?

2. What would be the results if the entire United States west of the Mississippi became a dry desert?

TABLE 18. INTERCORRELATION OF CONSEQUENCES TEST ITEMS WHEN SCORED USING FREQUENCY PROCEDURE (N=898).

Question	1	2	3	4
1		.375	.414	.381
2			.335	.335
3				.386

TABLE 19. MEANS AND STANDARD DEVIATIONS OF SCORES OBTAINED USING THE FREQUENCY METHOD FOR CONSEQUENCES TEST ITEMS (N = 898).

Item	X	SD
1	2109.8	1468.4
2	1901.3	1253.4
3	1674.7	1214.9
4	1384.6	1178.1
Total	7150.20	3721.75 (N=775)

3. What would be the results if everyone suddenly lost the sense of balance and were unable to stay up more than a moment?

4. What would be the results if everyone suddenly lost the ability to read and write?

The first digit of the code number in Tables 20 through 22 is the question number. The next digits identify category grouping and specific response. It will be noted in examining these responses that most could be logically linked to sex interests (Table 20). For example many items significantly more frequent for females dealt with cooking and household activities where those significantly more frequent for males dealt with sports or animals. Since these responses are less creative (less original as defined) the sex linkage of conforming responses found by Torrance (1962, pp. 111-114) appears to be substantiated here.

Examination of the differences in responses between I.Q. levels (Table 21) does not result in as clear a relationship as those between the sexes. However, if one examines the differences between observed and expected frequencies contributing to the Chi-square, it appears that where the high I.Q. level (120+) made more frequent than expected responses, the responses tend to be more esoteric possibly requiring more abstract thinking to arrive at a less obvious relationship. The correlation of I.Q. and total creativity of .61 and of the originality-remote scores and I.Q. of .31 (average of pre and post test correlation) further support this interpretation when it is realized that the responses analyzed here are the less original (since they are more frequent) and therefore should be expected to be even more highly related to I.Q. consistent with the theory which assumes I.Q. and creative response to be more highly related in ranges of I.Q. below 120 than above.

It might be concluded, therefore, that to the extent originality scores are based on responses requiring more abstract thinking, the higher I.Q. students will produce a higher frequency of such responses and will obtain higher creativity scores. But when infrequency of response is important in obtaining a score we might expect a drop in the correlation of I.Q. and creativity. Since the frequency scoring method makes no judgment of cleverness or abstractness one would expect to find a lower correlation of I.Q. with originality with this method than with the remote judgment method. This is exactly what was found. The correlation of I.Q. to originality (frequency method) was only .09 (N=342) as compared to r = .41 (N=778) using the originality-remote method for post-test scores.

Only three responses were significantly different between levels of socio-economic status (see Table 22). No interpretation was attempted.

An examination of unique responses was made to see if significant relationships could be determined. Unique in this case referred to single responses in the total population. No relationships were discernible. This would appear to support the conclusion that the factors of sex and I.Q. level discussed above for non-unique responses (responses made by 10 or more persons) are conforming factors related to non-creative

TABLE 20. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES FOR SEX

Code	Males	Females	Total	x^2	Responses
11030	14(25.5)	35(23.5)	49	10.813	No Doing Dishes
11033	11(19.8)	27(18.2)	38	8.166	No Need to Cook
11036	2(8.8)	15(8.2)	17	9.350	Save Going to the Store
11207	1(6.2)	11(5.8)	12	7.37	Loss of Jobs
11302	56(68.6)	76(63.4)	132	4.818	No Food Markets
11409	23(17.2)	10(15.8)	33	4.084	Save Time
11411	2(6.2)	10(5.8)	12	4.568	Could Do More Things
11501	58(71.8)	80(66.2)	138	5.529	People Have More Money
11701	17(23.9)	29(22.1)	46	4.146	No More Dishes
11706	70(86.8)	97(80.2)	167	6.770	No Stores
11708	6(13.0)	19(12.0)	25	7.852	No Cabinets
11031	18(13.00)	7(12.00)	25	4.006	No Meals
20504	40(32.2)	22(29.8)	62	3.931	No Specific Animals
20505	11(18.2)	24(16.8)	35	5.934	Be Very Hot
20512	90(109.2)	120(100.8)	210	7.032	Plants Would Die
20517	9(15.6)	21(14.4)	30	5.817	No Rain in West
20522	13(20.8)	27(19.2)	40	6.093	Die From Lack of Water
20523	2(6.2)	10(5.8)	12	4.568	No Schools There
20603	9(15.1)	20(13.9)	29	5.141	Couldn't Stay Clean
20606	4(10.9)	17(10.1)	21	9.081	No Swimming
20507	19(13.00)	6(12.00)	25	5.679	No Towns in West
30705	41(56.16)	67(51.84)	108	8.525	People Fall and Get Hurt
30706	5(12.48)	19(11.52)	24	9.340	Bump Into Each Other
30705	77(63.44)	45(58.56)	122	6.038	Everyone Crawl
31114	3(7.28)	11(6.72)	14	4.088	People Go Crazy
31306	33(23.40)	12(21.60)	45	8.205	No Sports
31307	7(11.96)	16(11.04)	23	4.285	More Sitting Down

df=1 P .05 ≥ 3.841
P .01 ≥ 6.635

TABLE 21. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES BY IQ LEVEL.

Code	IQ -90	IQ 91-119	IQ 120+	Total	x^2	Responses
11302	11(19.68)	80(79.95)	32(23.37)	123	7.015	No Food Markets
11501	10(19.68)	82(79.95)	31(23.37)	123	7.304	People Have More Money
11908	22(12.48)	50(50.70)	6(14.82)	78	12.520	No Specific Foods
11033	3(5.28)	16(21.45)	14(6.27)	33	10.321	No Need to Cook
11[illegible]01	2(6.72)	25(27.30)	15(7.98)	42	8.170	No Restaurants
11706	9(24.64)	102(100.10)	43(29.26)	154	16.415	No Stoves
11917	3(1.76)	15(7.15)	1(2.09)	19	8.033	No Farm Animals
20502	16(29.60)	128(120.25)	41(35.15)	185	7.721	Animals Would Die
20503	11(7.36)	34(29.90)	1(8.74)	46	7.899	People Would Move
20510	13(5.44)	18(22.10)	3(6.46)	34	11.279	No Houses in West
20805	3(16.48)	50(66.95)	50(19.57)	103	62.633	Overpopulated in East
30705	17(15.36)	52(62.40)	27(18.24)	96	6.115	People Fall and Get Hurt
30514	2(5.76)	21(23.40)	13(6.84)	36	6.774	No Acrobats
30805	2(10.72)	43(43.55)	22(12.73)	67	13.850	Couldn't Ride Bikes
31206	1(3.84)	23(15.60)	10(4.56)	34	10.287	More Wheel Chairs
41104	23(34.24)	156(139.10)	35(40.66)	214	6.530	No Books
40901	2(8.32)	29(33.80)	21(9.88)	52	16.168	More Radios

df=2 P .05 ≥ 5.991

P .01 ≥ 9.210

TABLE 22. SIGNIFICANT DIFFERENCES BETWEEN ORIGINALITY RESPONSES BY SE STATUS LEVELS

Code	Levels 1&2	Level 3	Level 4	Level 5	Level 6	Level 7	Total	x^2	Responses
20805	26(12.76)	18(13.92)	16(15.08)	32(33.64)	20(30.16)	4(10.44)	116	22.465	Overpopulated in East
20522	4(4.40)	4(4.80)	11(5.20)	5(11.60)	13(10.40)	3(3.60)	40	11.144	Die From Lack of Water
40901	13(6.05)	5(6.60)	10(7.15)	14(15.95)	10(14.30)	3(4.95)	55	11.807	More Radios

df=6 P .05 12.592
P .01 16.812

response and, therefore, the very reason no relationships could be discerned in the unique responses was because they were unique and essentially unrelated to sex or I.Q.

Reliability

Internal consistency. Internal consistency was estimated by examining the intercorrelation of items and correlation with total test score. This data is presented in Tables 23 and 24. The reader should be cautioned again about the skewed distributions for the Originality test when interpreting this data.

The data in Table 23 was derived from a random sample of individual's post-test scores (N=124). It will be observed that the correlations of items with like items is generally higher than correlations of unlike items. One exception are the Alternate Uses test items which correlate with each other at .575 and with two items of the Consequences test at .659 and .410. One explanation of this might be considered an indication of the validity of the items. Since flexibility (measured by the Alternate Uses test) is defined as the number of sets of responses and is related to fluency (measured by the Consequences test), this correlation could be expected theoretically. As one is more fluent with ideas the likelihood of more sets of ideas increases. In fact, in some types of tests (e.g. Guilford's Brick Test) both factors are scored from the same test.

In like manner the sensitivity test items (Seeing Problems Test) correlated at a somewhat higher than expected level with the Consequences Test items (fluency). Here again the relationship seems to support the item validity in that sensitivity to problems is considered a prerequisite to ideational fluency. The very high correlation of items 9 and 11 (.799) and 10 to 12 (.888) are due to the fact that these are the same items scored for two different factors (fluency and originality-remote). Such high correlations would suggest contamination of the two scoring procedures. It is also evidence of the lack of independence of the two scores since both obvious and remote responses yield a fluency score and the remote responses alone yield an originality score. This procedure is different from Guilford's in which only the obvious responses yielded a fluency score. However, it was the rationale of this investigation that the remote as well obvious scores should be considered an indication of ideational fluency.

Part-Total Relationships. Turning to Table 24 one can find the intercorrelations of sub-tests and the correlations of sub-tests with total scores for both pre and post testing. It will be noted that the low positive correlations are similar to expectations and those obtained by Guilford in numerous studies.

Test-Retest Reliability. Also, from Table 24, it will be observed that the test-retest reliability is within acceptable limits ranging from .314 for originality-remote to .755 for total.

Split-half Reliability. The item intercorrelations (Table 23) were used to compute Spearman-Brown split-half reliability coefficients. These are presented in Table 25. Reliabilities ranged from .326 for the originality-

TABLE 23. INTERCORRELATIONS OF TEST ITEMS FOR A RANDOM SAMPLE OF POST-TESTS (N=124)

Items*	1	2	3	4	5	6	7	8	9	10	11	12
1		.460	.157	.350	.242	.076	.104	.112	.117	.084	.037	.065
2			.139	.210	.089	.176	.023	.050	.062	.095	.042	.023
3				.575	.403	.210	.370	.373	.659	.432	.426	.301
4					.301	.198	.228	.206	.410	.282	.198	.158
5						.195	.273	.203	.392	.264	.119	.160
6							.122	.212	.176	.122	.201	.116
7								.593	.437	.417	.371	.343
8									.482	.422	.446	.376
9										.581	.799	.430
10											.478	.888
11												.433
12												

Key*		
Key*	1,2	Halves of Redefinition test (alternate items) (redefinition)
	3,4	Items of Alternate Uses (flexibility)
	5,6	Items of Plot-Titles (Orig. -C)
	7,8	Items of Seeing Problems (sensitivity)
	9,10	Items (2 each) of Consequence test (fluency)
	11,12	Items (2 each) of Consequence test (Orig. -R)

TABLE 24. INTERCORRELATION OF ALL MEASURES (N = 778).

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 IQ		.338	.280	.112	.404	.493	.289	.339	.210	.398	.535	.443	.530	.381	.406	.414	.489	.611
2 Socio.			.168	.041	.169	.199	.095	.128	.073	.206	.222	.152	.303	.166	.168	.208	.226	.288
3 Nom. **				.062	.171	.204	.196	.111	.198	.179	.241	.202	.242	.213	.145	.240	.261	.286
4 Act.					.067	.099	.090	.180	.080	.128	.164	.109	.126	.044	.230	.156	.181	.211
5 Redef.(Pre)						.399	.249	.211	.181	.271	.522	.564	.356	.247	.254	.281	.315	.445
6 Flex. (Pre)							.399	.449	.269	.456	.761	.425	.675	.407	.410	.434	.497	.652
7 Orig.-C (Pre)								.184	.251	.226	.439	.257	.281	.492	.162	.283	.254	.351
8 Sensi. (Pre)									.259	.496	.776	.214	.410	.200	.558	.347	.449	.541
9 Orig.-R (Pre)										.551	.520	.201	.265	.226	.254	.314	.304	.352
10 Flu. (Pre)											.778	.306	.486	.275	.474	.427	.604	.615
11 Total (Pre)												.454	.638	.404	.579	.517	.635	.755
12 Redef.(Post)													.449	.331	.279	.292	.348	.576
13 Flex. (Post)														.398	.487	.509	.586	.804
14 Orig.-C (Post)															.257	.340	.341	.526
15 Sensi.(Post)																.395	.572	.767
16 Orig.-R (Post)																	.663	.706
17 Flu. (Post)																		.842
18 Total (Post)																		

** N = 566

For 500 df two-tailed test
P .05 = .088
P .01 = .115

clever score to .744 for the sensitivity score. Total test-retest reliability was .734. As it was suspected that the high correlations of items 9 and 11 and 10 and 12 (see Table 23) were creating a particularly high split-half correlation for the total battery, this was recomputed omitting these items. When 9 and 10 were omitted the r_{tt} was .728. When 11 and 12 were omitted r_{tt} was .747. Both of these coefficients are quite similar to that obtained when these items were retained.

Inter-scorer Agreement. Since the tests were scored subjectively by trained persons using detailed guidelines, the extent of the inter-scorer agreement is also a relevant source of reliability data. Table 26 reports coefficients of agreement between scorers for each test for a random sample of three classrooms. It will be noted that correlations ranged from .67 to .99, the lowest being the plot-titles test requiring a judgment of the cleverness of titles. The Gestalt transformation test (redefinition) was scored objectively and does not appear in this table.

Concurrent Validity

Concurrent validity was estimated by correlating items with measures of Peer Nomination and an Interest and Activity Inventory.

It will be noted from examination of Tables 24 and 27 that generally low but positively and statistically significant coefficients were obtained when creativity measures were correlated with Peer Nomination and Interest Activity scores. Such a degree of correlation would indicate some validity for the creativity measures. However, the degree of validity and reliability held by the criterion measures themselves is of great importance (Guilford 1965 p. 488). Unfortunately, this data for the criterion measures was not available and a correction for attenuation not possible. However, it is reasonable to assume from the literature (Taylor, 1964) that reliability and validity of these measures is low and that estimates of creativity test validity obtained would only be higher should the reliability and validity be raised. Furthermore, these low criterion correlations can be tolerated when the intercorrelations are low and there are a number of sub-tests in the battery (Guilford, 1965, p. 408).

Little difference between items was noted in their relationship to the criterion variables. Furthermore it would appear that I.Q. and the criterion variables were not closely related with correlations of .280 and .112 for I.Q. correlated with Peer Nomination and Activity Inventory. However, the total test and the items appear to correlate more with the I.Q. scores than with the criterion variables. This may be due to the greater reliability of the I.Q. test. Also as Wallach and Kogan have indicated, the fact that it is a test situation may cause correlations of I.Q. and creativity to be higher than that obtained in a more play-like situation (1965, p. 292).

A random sample of 107 cases was sub-divided by levels of I.Q., Sex, and Socio-economic status and the correlations of total battery score with the criterion variables examined (Table 28). Although the N in some of these groups is very low the variation in correlation is of interest. For example, it will be noted that at the higher socio-economic status levels the correlation of creativity to I.Q. increases. This is exactly what

TABLE 25. SPEARMAN-BROWN SPLIT-HALF RELIABILITY COEFFICIENTS COMPUTED FROM A SAMPLE OF POST-TESTS (N = 124).

Test	r
Total	.734
Redefinition	.630
Flexibility	.730
Originality-C	.326
Sensitivity	.744
Fluency	.734
Originality-R	.464

TABLE 26. COEFFICIENTS OF AGREEMENT BETWEEN SCORERS COMPUTED FOR A RANDOM SAMPLE OF THREE CLASSROOMS FOR EACH TEST.

Test	Range of coefficients	N
Problems Test (Sensitivity)	.97 to .99	27 to 32
Alternate Uses (Flexibility)	.94 to .98	24 to 27
Consequences (Fluency)	.94 to .99	15 to 36
(Originality--Remote)	.86 to .99	
Plot Titles (Originality--Clever)	.67 to .91	11 to 37

TABLE 27. INTERCORRELATIONS OF A SAMPLE
OF 107 CASES ITEM SCORES.

	Total Test	Activity Inventory	Nomination	IQ
1 Redef.	.421	.144	.211	.471
2 Redef.	.356	.098	.072	.278
3 Flex.	.751	.171	.277	.582
4 Flex.	.600	.136	.198	.502
5 Orig. C	.563	.197	.311	.368
6 Orig. C	.315	.260	.088	.174
7 Sensi.	.694	.389	.370	.355
8 Sensi.	.654	.319	.258	.209
9 Flu.	.794	.123	.328	.453
10 Flu.	.696	.273	.165	.339
11 Orig. R	.576	.066	.238	.331
12 Orig. R	.515	.287	.183	.255
13 Total		.332	.345	.612
14 Act. Inver.			.262	.050
15 Nom.				.282

For 100 df two-tailed test.

P .05 = .195

P .01 = .254

TABLE 28. CORRELATIONS OF TOTAL CREATIVITY (POST-TEST), PEER NOMINATION, INTEREST INVENTORY AND IQ FOR VARIOUS GROUPINGS OF SUBJECTS.

Grouping	Act.	Nom.	IQ	N
Total	.332**	.345**	.612**	107
IQ 90-	.237	.331	-.174	12
IQ 91-119	.407**	.288*	.439**	72
IQ 120+	.258	.242	.044	23
Females	.290	.373**	.596**	50
Males	.367**	.421**	.612**	57
SE Status 1&2	.642*	.379	.744**	12
SE Status 3	.053	.496	.820**	14
SE Status 4	.379	.388	.327	11
SE Status 5	.476*	.287	.496**	27
SE Status 6	.156	.323	.551**	26
SE Status 7	.591*	.561*	.521	13

* P < .05

** P < .01

might be expected since these students would more likely have the necessary background to perform well on both measures. The relationship of creativity to criterion measures, Peer Nomination and Activity Inventory is stronger for males than for females. The Activity Inventory also appears to be a stronger predictor of creativity for the extremes of socio-economic status than for levels between.

Construct Validity

Construct validity was estimated by factor analyzing the items to determine if the obtained factors were congruent with factors obtained by Guilford with other samples and in his previous sixth grade sample (Merrifield, et. al., 1963, 1960; Guilford, et. al., 1952, 1954, 1956; Hoepfner and Guilford, 1965).

Factor-Analysis Procedures. Since many of the score distributions were positively skewed and some were truncated, following Merrifield, Guilford and Gershen (1963), the distributions were dichotomized at the medians and a phi coefficient was computed to form a correlation matrix to be factor analyzed. This matrix is shown in Table 29.

In accordance with the BMD 03M program, using squared multiple correlations as estimates of communalities, a principal-components factor solution was effected in which all factors having eigenvalues greater than zero were extracted. Table 30 presents the principal-factor matrix. It will be noted that eight factors were extracted accounting for 100.43 per cent of the total communality. The first five factors accounted for 97.39 per cent of the communality.

Seven factors were included in an orthogonal rotation of the factor matrix. This rotated factor matrix is presented in Table 31. It will be observed that two factors had no significant loadings (commonly considered .30 or above) and were referred to as residual factors. Five factors were left to be interpreted.

Factor interpretation. The significant factors which were interpreted are presented in Table 32. In spite of the limitations of this factor analysis, three of the hypothesized factors appeared to be supported thus providing construct validity for these tests. A fourth factor was implied.

Clearly emerging was redefinition or Guilford's convergent production of semantic transformations (NMT). The split-halves of the Gestalt Redefinition test loaded on this factor .54 and .45. Also loading on this factor was I.Q. at .41. Since this factor, unlike the others, is concerned with convergent production, the relationship to I.Q. is logical.

Another clear factor was DMC, divergent production of semantic classes, or flexibility. The two Alternate Uses tests loaded on this factor at .45 and .51. Also loading on this factor was the Problems Test, Part 1 which purports to measure sensitivity to problems. This was a secondary loading for this variable. It will also be noted that Alternate Uses I had a secondary loading on EMI, sensitivity to problems. The relationship between sensitivity and flexibility is not entirely unexpected. A similar finding was obtained in Guilford's junior high school group (1961). Since sensitivity

TABLE 29. INTERCORRELATIONS OF TEST ITEMS FOR A RANDOM SAMPLE
OF POST-TESTS (N=107) USING PHI COEFFICIENTS

Items*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		.319	.150	.231	.062	.016	.027	.093	.151	.034	.173	.020	.277	.069	.142	.326
2			.121	.096	.023	.058	.028	.088	.029	.112	.028	.036	.150	.103	.039	.215
3				.376	.158	.030	.348	.324	.373	.264	.224	.173	.472	.181	.174	.279
4					.111	.073	.264	.148	.225	.267	.164	.185	.450	.014	.003	.375
5						.054	.135	.059	.143	.049	.056	.019	.158	.049	.108	.119
6							.074	.030	.028	.024	.040	.011	.091	.034	.009	.051
7								.409	.365	.236	.402	.280	.551	.177	.207	.262
8									.367	.245	.290	.284	.472	.223	.181	.187
9										.405	.676	.315	.542	.073	.339	.340
10											.440	.679	.539	.060	.036	.336
11												.418	.468	.037	.182	.280
12													.429	.045	.074	.329
13														.121	.147	.459
14															.185	.102
15																.174
16																

*1,2 Halves of Redef. test (alternate items)-(redef.)
3,4 Items of Alternate Uses Test (flexibility)
5,6 Items of Plot-titles (Orig.-C)
7,8 Items of Seeing Problems (Sensitivity)
9,10 Items (2 each) of Consequences Test Scored for Fluency
11,12 Items (2 each) of Consequences Test Scored for Originality-remote
13 Total Post-test
14 Activity Inventory
15 Peer Nomination
16 I.Q.

TABLE 30. PRINCIPAL-FACTOR SOLUTION FOR 15 VARIABLES*

Variable	I	II	III	IV	V	VI	VII	VIII	h^2
1 Gestalt Redefinition 1	.238	.409	-.212	-.214	-.086	-.038	-.019	-.015	.324
2 Gestalt Redefinition 2	.169	.291	-.237	-.080	-.189	-.099	.015	.048	.222
3 Alternate Uses 1	.516	.242	.041	.179	.133	.024	-.092	.045	.386
4 Alternate Uses 2	.424	.212	-.241	.088	.289	-.004	-.012	-.016	.375
5 Plot Titles 1	.172	.158	.070	.052	.066	.154	.078	.037	.097
6 Plot Titles 2	.071	.066	-.014	.040	.035	-.037	.170	.043	.043
7 Seeing Problems 1	.553	.050	.213	.211	.063	-.076	.065	-.050	.414
8 Seeing Problems 2	.498	.058	.183	.200	-.125	-.115	-.049	-.006	.357
9 Consequences Total 1	.721	-.052	.266	-.262	.075	.027	-.041	.032	.671
10 Consequences Total 2	.635	-.346	-.298	.059	-.065	.055	-.021	.049	.624
11 Consequences-Remote 1	.665	-.250	.181	-.240	.050	-.094	.044	.009	.610
12 Consequences-Remote 2	.591	-.392	-.247	.099	-.141	.041	.013	-.036	.596
13 **Activity Inventory**	.194	.200	.133	.191	-.225	.039	.015	.023	.185
14 **Peer Nomination**	.298	.180	.273	-.101	-.166	.131	.000	-.036	.251
15 I.Q.	.542	.207	-.246	-.090	.007	.050	.038	-.059	.410
Total	—	—	—	—	—	—	—	—	5.565
Contribution of factor	3.262	.847	.654	.377	.281	.092	.057	.021	5.591
Percent of total h^2	58.61	15.22	11.75	6.77	5.04	1.65	1.02	.37	100.43

*Squared multiple correlations were used as estimates of communalities.

TABLE 31. ROTATED FACTOR MATRIX*

	Variable	I	II	III	IV	V	VI	VII	h^2
1	Gestalt Redefinition 1	-.028	.541	.082	.036	.124	.077	.028	.324
2	Gestalt Redefinition 2	.051	.452	-.034	.097	.028	-.027	.057	.222
3	Alternate Uses 1	.125	.136	.189	.302	.456	.115	.056	.386
4	Alternate Uses 2	.179	.225	.070	-.001	.511	.074	.142	.375
5	Plot Titles 1	-.010	.035	.064	.114	.140	.224	.092	.097
6	Plot Titles 2	.007	.036	.009	.027	.038	.023	.196	.043
7	Seeing Problems 1	.187	-.040	.317	.382	.301	.027	.195	.414
8	Seeing Problems 2	.195	.044	.256	.458	.185	-.049	.059	.357
9	Consequences Total 1	.246	.089	.714	.166	.202	.150	.000	.671
10	Consequences Total 2	.737	.082	.204	.052	.171	.001	.010	.624
11	Consequences-Remote 1	.368	.011	.672	.077	.101	-.008	.080	.610
12	Consequences-Remote 2	.737	.027	.181	.106	.081	-.022	.026	.596
13	Activity Inventory	.013	.094	.0[illegible]	.406	.015	.094	.042	.185
14	Peer Nomination	-.033	.124	.300	.298	-.029	.231	-.028	.251
15	I.Q.	.293	.412	.192	.076	.276	.152	.110	.410

*Squared multiple correlations were used as estimates of communalities.

TABLE 32. FACTOR INTERPRETATION*

Variable	DMT-DMU I	NMT	DMT-DMU II	EMI	DMC
1 Gestalt Redefinition 1		.541			
2 Gestalt Redefinition 2		.452			
3 Alternate Uses 1				.302	.456
4 Alternate Uses 2					.511
5 Plot Titles 1					
6 Plot Titles 2					
7 Seeing Problems 1			.317	.382	.301
8 Seeing Problems 2				.458	
9 Consequences Total 1			.714		
10 Consequences Total 2	.737				
11 Consequences-Remote 1	.368		.672		
12 Consequences-Remote 2	.737				
13 Activity Inventory				.406	
14 Peer Nomination			.300	(.298)	
15 I.Q.	(.293)	.412			

*All variables with loadings of .30 or above were considered significant for interpretation purposes.

is considered a basic attribute to the other creative aspects this is also a logical relationship (Guilford, 1957). One would need sensitivity to a variety of possibilities in order to be flexible rather than having a mind set.

The factor, EMI, evaluation of semantic implications, or sensitivity, was obtained with both of the Problems Tests loading at .38 and .45. One Problems test (Problems 1) had secondary loadings on DMT-DMU II (.31) and DMC (.30). It will also be noted in the preceding discussion that Alternate Uses 1 had a secondary loading of .30 on EMI. The Activity Inventory had a loading of .40 on EMI which also appears to be a logical relationship since the more sensitive person would be more likely to have a variety of interests and thus have a higher activity score.

Two factors combining DMT and DMU were obtained. It appears obvious that the high correlation between the fluency and originality scoring procedures resulted in a failure of the scores to separate as different factors. Guilford's procedure was to score Fluency as the total number of obvious responses and Originality-remote as the number of remote responses. In this study Fluency was the number of both obvious and remote responses, thus resulting in a lack of independence for the two scores.* Some indication of validity is evident, however, in that the two items hypothesized as measuring Originality-remote (DMT, divergent production of semantic transformations) load together on DMT-DMU I at .36 and .73. It will also be noted that Peer Nomination (a measure of originality of ideas) loads at .30 on DMT-DMU II.

The Plot Titles test items do not load significantly on any factors due to their low communalities, .09 and .04.

It would appear reasonable to conclude that a satisfactory degree of construct validity exists for the revised tests of Redefinition (Gestalt transformation), Sensitivity (Seeing Problems), and Flexibility (Alternate Uses).

Item Analysis

Gestalt Redefinition Test. Reliabilities of this test are adequate. Split-half r = .63 and test-retest r = .56. Since the test is objectively scored no inter-scorer correlation was computed.

The Gestalt Redefinition Test was not as highly correlated with the total creativity battery score as other tests in the battery (r = .57). Its relationship to I.Q. was also relatively low (.443). It does not appear to overlap the other items in the battery. Construct validity was supported in the factor analysis. It would appear, as indicated by Guilford

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* Although the reasons for the DMU-DMT combination appears to be the lack of independence in the scoring procedure, it is interesting to note that Guilford (1967 p. 453) indicates that summing both remote and obvious scores would give a measure of both DMU and DMT with DMU dominant "... because it has been the writer's experience that the variance of scores for obvious consequences is about double that for remote consequences".

(1957) to measure a convergent aspect of the intellect as compared with the other items which appear to measure divergent aspects.

It will be observed that the odd items of the test contribute most to the relationship to Peer Nomination and Activity Inventory measures, as well as to I.Q. Furthermore, there is considerable difference between the communalities of the alternate items which may be considered an estimate of their reliabilities (.32 and .22). A reexamination of the wording of the items and their difficulty is suggested.

Alternate Uses Test. This test has a very respectable split-half reliability (.73) as is its test-retest reliability (.67). There is also scorer agreement (.94 to .98).

The test contributes substantially to the total battery score with r = .80. This test also has the highest correlation with I.Q. (r = .53). Construct validity was supported by the factor analysis.

The two items making up Alternate Uses 1 and 2 appear to be comparable in terms of validity, both correlating comparably with total battery score, and with the criterion variables. It will be noted, however, that Alternate Uses 1 had a secondary loading of .30 on the EMI, sensitivity factor, indicating a certain degree of sensitivity contributing to a score of this item not evident on the other item. Although not appearing in the factor analysis it was observed (in Table 23) that the Alternate Uses 1 item had a higher correlation with Consequences 1 (Fluency) than with its mate. Otherwise there does not appear to be a serious overlap problem.

Plot Titles Test. This test had the lowest reliability of any test in the battery (split-half = .32 and test-retest = .49). Agreement between scorers was also lower (.67 to .91). An obvious needed correction would be a more detailed scoring guide to increase objectivity of scorer judgment of the clever responses.

Correlations with criterion variables were low for this test. Construct validity was not established by the factor analysis.

It would appear that Plot Titles 1 was more highly correlated with total battery, Peer Nomination and I.Q. than Plot Titles 2. However, two had a higher correlation to Activity Inventory. Plot Titles 1 had a higher correlation with Consequences 1 (Fluency) than to any other subtest. One might conclude, therefore, that the two items were not comparable with one being either easier or more easily scored than two.

Seeing Problems Test. This test had high reliabilities of .74 for split-half and .58 for test-retest. Scorer agreement was very high (.97-.99).

The test contributes substantially to the battery score (.76) and also has significant positive correlations with Activity Inventory and Peer Nomination measures. Correlation with I.Q. is .40, about the same as with the other tests. Construct validity was supported in the factor analysis.

Both Seeing Problems 1 and 2 seem to be equally valid, correlating similarly with total battery and Activity Inventory and Peer Nomination. When examining relationships to other tests (Table 23) it is observed that these items correlate higher with the Consequences Tests than with the others in the battery. Although not borne out by the current factor analysis, the relationship of sensitivity to fluency and originality has been observed in other studies of those tests. Guilford points out that sensitivity to problems, while not a divergent aspect of the intellect, is a necessary pre-requisite to divergent production (Guilford, 1957).

Consequences - Fluency. Relatively high reliability coefficients were obtained. Split-half reliability was .73 and test-retest was .60. Scorer agreement ranged from .94 to .99.

The fluency score made the highest contribution to the total battery score (r = .84). It was also positively and significantly correlated to Activity Inventory (.18) and Peer Nomination (.26). Relationship to I.Q. was .48. Construct validity was not clear since the scoring procedure did not allow independent scores for fluency and originality-remote (see preceding discussion).

There appear to be some differences between the two items when examining the correlations with the criterion variables and their contribution to total battery score. Consequences 1 (Fluency) also correlates higher with Alternate Uses 1 (.65) than it does with any other item other than itself scored for Originality-remote. A reexamination of these items would seem desirable.

Consequences (Originality-remote). Reliabilities for the Consequences tests were low. Split-half r = .46 and test-retest r = .31. Scorer agreement ranged from .86 to .99. Evidently the judgment involved in determining a remote as compared to obvious response was a factor in the lower reliabilities. This conclusion is supported when the alternate, frequency of response method, is compared (see the discussion of this procedure and the findings when compared).

Consequences 1 and 2 appear to make a comparable contribution to the total battery score (.57 and .51) and the combined score for Consequences (Originality-remote) correlates .70 with total battery score. Relationships with criterion variables are positive and significant (.15 with Activity Inventory and .24 with Peer Nomination). Correlation with I.Q. is .41. Construct validity was not clear due to the lack of independence of the Originality-remote score and the Fluency score. However, it will be noted that Consequences 1 scored for Originality-remote had a secondary loading of .36 on the same factor on which Consequences 2 (Originality-remote) loaded at .73.

There is a considerable variation in parts 1 and 2 and their relationship to Peer Nomination and Activity Inventory (Peer Nomination r = .06 and .28 and Activity Inventory r = .23 and .18). However, both items appear to be comparably related to the total battery score. Consequences 1 (Originality-remote) appears to share some variance with Alternate Uses 1 (.42) and Seeing Problems 2 (.44). However, no serious overlap is evident.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary

A revised battery of Guilford's tests was administered to a group of approximately 900 sixth grade children in central Indiana in 1965-66 as part of a project jointly sponsored by Indiana University and the U. S. Office of Education.

The Problem. The purpose of the present study was to conduct a detailed analysis of the Indiana test data. It was believed that dissemination of the results of these tests would serve as a source of comparison by school personnel should they administer the same or similar tests. Furthermore it was believed that the analysis would also contribute to the basic store of knowledge regarding the "creative" aspects of the intellectual purported to be measured by these tests.

The objectives of the study were: 1) to establish norm data from the battery of creativity tests, 2) to obtain frequency of response scores for the originality sub-test to compare these scores with scorer judgment type "remote" scores initially obtained, 3) to perform an item analysis for each item in the battery of tests, 4) to analyze and report on the relationships of measured creativity, socio-economic status, I.Q. and sex, with validity estimates (criterion) obtained from a peer nomination and interests and activity inventory, 5) to analyze construct validity by conducting a factor analysis of the test data.

Procedures. The objectives of the study were accomplished in two phases: those dealing with the further analysis and development of the test battery; and analysis concerned with exploring relationships of creativity with other variables for the population tested.

Means, standard deviations, minimum and maximum scores were computed for the total population and for sub-divisions of sex, I.Q., socio-economic level and age. These were computed for both pre and post test data and were used to establish norms for this population. Furthermore, the t test was applied to detect significant mean differences between levels.

The originality test, initially scored using judgment of "remoteness" by trained persons was rescored on a frequency basis. Individuals' frequency scores were compared with originality scores in an effort to determine equivalency of the two procedures. Additionally, responses were compared to see if there were meaningful differences in frequency and type of response between levels of sex, I.Q., and socio-economic status. Comparison by frequency scores with remote judgment scores was made using correlation analysis. The chi square test was used to select significantly different frequencies of responses between levels.

Estimates of reliability of the tests were obtained by intercorrelation of items and by test-retest and by split-half coefficients for the total test and its sub-tests. A further index of reliability (objectivity) was obtained by examination of scorer agreement.

Two types of validity were examined. Concurrent validity was estimated by determining relationships of the test items, sub-test and total test scores with two independent measures of creativity. These independent measures were peer nomination and activity inventory scores. Construct validity was estimated by factor analyzing the test data to see if the items resulted in each of the factors that Guilford had previously identified.

The intercorrelation of items with sub-test and total test scores and correlation with the criterion measures of peer nomination and interest inventory scores was examined to indicate overlap of items, item validity and reliability.

Conclusions

The following general conclusions were drawn from the findings.

Norm data. It was concluded that the battery should be revised to provide a lower limit for the sub-tests and to result in less skewing of some of the sub-tests, especially Plot Titles (originality-clever) and Consequences (originality-remote).

It was concluded that with the exception of the Redefinition test the sub-tests in the battery appeared to favor females.

It was further concluded that there were significant differences on creativity test mean scores between levels of intelligence.

Differences between age levels were observed but it could not be concluded whether these differences were related to age or to intelligence since older children might have been retained in sixth grade.

It was concluded that the written test and content of all items was biased in favor of the upper socio-economic level student.

Frequency Scoring of the Consequences Test. Although it was not possible to make a definite conclusion there was considerable evidence to indicate the remote judgment method of scoring the Consequences Test for originality is not an accurate procedure. This general conclusion is based upon two subordinate conclusions. First, it would appear that the judgment of the remoteness of a response is a function of the scorer's experience with that particular response, rather than whether the response is in reality remote in a particular population of subjects. Secondly, the definitions of originality as infrequency of response and remoteness of response do not appear to be compatible. The remote judgment method, apart from being less objective, as noted above, appears to require abstract thinking and thus be strongly and positively related to I.Q. as compared to the frequency method which was not as strongly related to I.Q.

No conclusions were possible regarding the relationship of responses to levels of socio-economic status. Furthermore, no conclusions were possible relative to unique responses and sex, I.Q. and socio-economic status. There was some evidence to indicate that the less original (more frequent) responses, when boys and girls were compared, support Torrance's hypothesis that conformity is linked to sex roles.

Reliability. Acceptable internal consistency was obtained when intercorrelation of items and correlation with total test score was examined.

Test-retest and split-half reliability was found to be within acceptable limits.

Inter-scorer agreement was high in all cases.

Concurrent Validity. Concurrent validity was considered acceptable with generally low but positively and statistically significant coefficients obtained when creativity measures were correlated with Peer Nomination and Interest Activity scores.

It was also concluded that the creativity test items share considerable variance with I.Q. test scores.

No conclusive generalizations could be made regarding relationships of creativity test scores to criterion measures for levels of I.Q., sex and socio-economic status.

Construct Validity. Based upon a factor analysis of the items comprising the sub-tests of the battery it was concluded that a satisfactory degree of construct validity existed for the revised tests of Redefinition (Gestalt Transformation), Sensitivity (Seeing Problems), and Flexibility (Alternate Uses).

Item Analysis. It was concluded that the Gestalt Redefinition Test, the Alternate Uses Test, the Seeing Problems Test, and the Consequences Test scored for fluency were acceptable, reliable and valid measures of the aspects purported to be measured by these tests and should continue to be included in the battery.

The Plot Titles test needs extensive revision to increase its reliability, to equalize the difficulty of its items and to substantiate its validity.

The Consequences test scored for Originality-remote also needs further revision to increase reliability and to substantiate its validity. It was concluded that a different method of scoring the Consequences Test for Fluency in which both remote and obvious scores were totaled to obtain a fluency score disguised the true validity of the originality-remote score.

Implications

The implication of this study in regard to further use of these tests at this age level would appear to be that the test battery with the exception of the Plot Titles sub-test is a reliable and somewhat valid measure at the sixth grade level. However, distinctions should be made between the sexes and intelligence and socio-economic levels when interpreting scores. The existence, however, of a separate entity apart from intelligence which could be called "creativity" remains questionable and should not be implied from the findings and conclusions of this study.

There are a number of implications for further research which can be derived from this study. First, it would appear that the existence of a separate entity called "creativity" from that measured by standard intelligence tests has not been established in this study but clues are available which indicate further studies should be done to determine the effect of the test situation and the scoring procedures upon the obtained "creativity" scores. This implication was strongly suggested when the frequency and remote methods for scoring the Consequences Test for originality were compared.

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APPENDIX

APPENDIX A. Responses to the Consequences Test and Their Frequency.

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     RUN 1 - ALL CARDS
                                                                                                   A1
10201     001897 NO GARBAGE COLLECTORS                                                         1
10202     004894 NO GARBAGE TO TAKE OUT                                                        4
10203     001897 NO TOILETS                                                                    1
10206     001897 NO EXCRETA                                                                    1
10207     004894 NO USE FOR GARBAGE CANS                                                       4
10208     001897 NO GARBAGE DESPOSAL                                                           1
10209     002896 NO GARBAGE TRUCKS                                                             2
10302     002896 NO MORE CAVITIES                                                              2
10303     001897 NO MORE DENTISTS                                                              1
10305     005893 NO NEED TO BRUCH YOUR TEETH                                                   5
10307     001897 YOU WOULDNT GET SICK                                                          1
10402     003895 NO MORE BATH ROOMS                                                            3
10403     004894 MORE ROOM FOR STORAGE                                                         4
10405     002896 KITCHENS COULD BE USED AS RECREATION ROOMS OR FOR A DIFFERENT ROOM            2
10406     015883 SAVE ROOM                                                                    15
10501     011887 NO LIVER                                                                     11
10502     016882 NO STOMACH                                                                   16
10503     001897 SAVE MONEY                                                                    1
10504     003895 NO TASTE BUDS                                                                 3
10505     002896 NO INTESTINES                                                                 2
10508     001897 NO LIVER                                                                      1
10509     007891 NO DIGESTIVE SYSTEM                                                           7
10510     001897 FEWER PIMPLES                                                                 1
10511     002896 NO GALL BLADDER                                                               2
10512     001897 NO APPENDIX                                                                   1
10601     003895 COULD TRAVEL FURTHER                                                          3
10603     001897 SPACE TRAVEL EASIER                                                           1
10605     003895 SAVE GAS                                                                      3
10701     002896 FEWER DOCTORS NEEDED                                                          2
10703     002896 NO DRUGSTORES                                                                 2
10706     007891 NO NEED FOR VITAMIN PILLS                                                     7
10802     007891 SAVE WATER                                                                    7
10804     002896 NO MORE HEALTH BOOKS                                                          2
10805     002896 LESS FAMILY ARGUMENTS                                                         2
10806     001897 NO CHARITY                                                                    1
10807     001897 NO NEED FOR FARM MAGAZINES                                                    1
10808     002896 NO NEED TO HAVE A MENU                                                        2
10901    001 897 NO GYMS                                                                       1
10903     002896 NO NEED FOR DIFFERENT SIZES OF CLOTHES                                        2
10906     002896 NO METRACAL OR SEGO DIET FOOD                                                 2
10907     006892 LOSE WEIGHT                                                                   6
10908     015883 NO DIETS                                                                     14
10909     001897 NO REDUCING MACHINES                                                          1
10910     003895 NO WEIGHT CONTROL PILLS                                                       4
11001     011887 NO NEED FOR SPICES                                                           11
11002     003895 HAVE SMALLER BILLS                                                            3
11003     002896 WORLD OVERRUN BY ANIMALS                                                      2
11004     001897 POPULATION EXPLOSION                                                          1
11005     004894 NO FOOD SPILLED ON CLOTHES                                                    4
11006     003895 SHIPS NOT USED TO CARRY FOOD                                                  3
11007     006892 NO NEED TO HUNT OR FISH                                                       6
11008     007891 NO FOOD COMMERCIALS                                                           7
11009     003895 NO NEED TO WASH HANDS SO OFTEN                                                3
11010     008890 NO EATING FOOD YOU DIDNT LIKE                                                 8
11011     007891 MORE FACTORIES BUILT ON FARM LANDS                                            7
11012     004894 NO NEED FOR COOKBOOKS                                                         4
11014     005893 NO FOOD SALES                                                                 5
11015     003895 USE LESS ELECTRICITY                                                          3
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11018        020878 SAVE LAND                                                        19
11019        001897 HAVE NOTHING BUT DEPARTMENT STORES                                1
11020        003895 NO BBING LATE FOR SUPPER                                          3
11021        002896 ENDANGER THE ECONOMY                                              2
11022        003895 NO NEED TO THANK GOD FOR FOOD                                     3
11023        003895 NO ANIMALS ASSOCIATED WITH MANS FOOD                              3
11024        002896 NO NEED FOR FERTILIZER                                            2
11025        001897 NO NEED FOR APPLIANCE DEALERS                                     1
11026        013885 NO NEED FOR GROCERY SACKS OR FOOD CONTAINERS                     13
11027        003895 COULD GET TO SCHOOL ON TIME                                       3
11028        016882 SAVE HARD WORK FOR MOM IN THE KITCHEN                            16
11029        001897 WOULDNT HAVE TO KNOW TABLE MANNERS                                1
11030        049849 NO DOING DISHES                                                  49
11031        025874 NO MEALS                                                         25
11032        001897 NO TOOTH BRUSH                                                    1
11033        038860 NO NEED TO COOK                                                  38
11034        002896 NO SETTING TABLES                                                 2
11036        017881 SAVE GOING TO THE STORE                                          17
11037        001897 NO MORE TV DINNERS                                                1
11039        001897 NO MORE SCARECROWS                                                1
11040        001897 NO MORE COUNTRY                                                   1
11041        002896 MORE CITIES                                                       2
11042        001897 NO MORE FOOD SHIPMENTS                                            1
11043        001897 NO PICNICS                                                        1
11044        001897 NO THANKSGIVING DINNERS                                           1
11045        002896 NO CANNING                                                        2
11046        014884 NO ANIMALS WOULD BE BUTCHERED                                    14
11101        002896 NO GREASE                                                         2
11102        012886 NO NEED FOR SOIL                                                 12
11103        001897 NO NEED FOR CAN OPENERS                                           1
11104        001897 NO NEED FOR WEIGHT SCALES                                         1
11105        001897 NO MORE BONES FOR DOGS                                            1
11106        001897 NO MORE JOLLEY GREEN GIANT                                        1
11107        020878 NO LUNCH HOUR OR COFFEE BREAK                                    19
11108        006892 NO HALLOWEEN TRICK OR TREAT                                       6
11109        011887 NO NEED TO WORRY ABOUT LACK OF FOOF                              11
11110        006892 NO NEED FOR SUN                                                   6
11201        049849 NO NEED FOR FARMS                                                47
11203        066832 NO NEED FOR FARM EQUIPMENT                                       67
11204        007891 NO MORE PRODUCE TRUCKS                                            7
11205        011887 FARMERS WOULDNT HAVE TO WORK                                     11
11207        012886 LOSS OF JOBS                                                     13
11208        024874 NO COOKS                                                         24
11209        002896 NO NEED FOR FARM HOUSES                                           2
11210        009889 NO NEED FOR FARM HOUSES                                           9
11212        001897 NO USE FOR MILK COMPANIES                                         1
11213        007891 NO PEOPLE TO OWN STORES                                           7
11214        001897 NO NEED FOR PEOPLE TO MAKE PLATES                                 1
11215        003895 NO NEED FOR MEAT PACKING PLANTS                                   3
11216        003895 NO NEED FOR PLANTATIONS                                           3
11217        001897 NO LUNCH LADY                                                     1
11218        001897 NO NEED FOR PEOPLE TO MAKE SILVERWARE                             1
11219        003895 NO MORE BUTCHERS                                                  3
11220        002896 NO NEED FOR FISHERMAN                                             2
11221        011887 NO NEED FOR WORKERS ON FARMS                                     11
11222        001897 NO MILKMEN                                                        1
11223        002896 NO FARM DAY                                                       1
11224        001897 REOPLE IN FREEZING PLANT OUT OF WORK                              1
11225        001897 NO GARDENS                                                        1
11226        002896 MORE PEOPLE WORKING IN FACTORIES                                  2
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11227       001897 NO NEED FOR HUNTERS                                                  1     A3
11228       001897 NO MORE RANCHES                                                      1
11229       007891 FARMERS WOULD GO OUT OF BUSINESS                                     7
11301       047851 NO RESTAURANTS                                                      46
11302       132766 NO FOOD MARKETS                                                    130
11303       001897 NO CHINA FACTORIES                                                   1
11304       002896 NO SNACK BARS                                                        2
11305       016882 CANNERIES ELIMINATED                                                16
11307       005893 NO MORE STORAGE                                                      4
11308       016882 NO CAFETERIAS                                                       15
11309       003895 STORES NOT SO BIG                                                    3
11310       003895 NO PACKING COMPANIES                                                 3
11311       003895 NO FRUIT OR VEGETABLE STANDS                                         3
11312       003895 NO BAKERIES                                                          3
11313       011887 NO FOOD FACTORIES                                                   11
11314       001897 NO NEED FOR LUNCH ROOMS                                              1
11401       003895 MORE TIME FOR TV                                                     3
11402       014884 COULD STUDY LONGER                                                  14
11405       029869 COULD PLAY MORE                                                     29
11406       050848 COULD DO MORE WORK WITHOUT STOPPING                                 50
11407       016882 MORE SLEEP                                                          16
11408       002896 BE ON THE GO ALL THE TIME                                            2
11409       033865 SAVE TIME                                                           34
11410       001897 MORE TIME WITH THE CHILDREN                                          1
11411       012886 COULD DO MORE THINGS                                                12
11412       001897 MORE READING                                                         1
11413       005893 HAVE MORE FUN                                                        5
11501       138760 PEOPLE HAVE MORE MONEY                                             138
11503       002896 COULD BUY MORE OF OTHER THINGS                                       2
11601       015883 NO STARVATION                                                       15
11602       001897 NO MORE MALNUTRITION                                                 1
11603       005893 NO STOMACH ACHES                                                     5
11604       007891 NO MORE DISEASES FROM FOOD AS FOOD POISONING                         7
11605       004894 NO MORE UPSET STOMACHES                                              4
11606       002896 YOU WOULDNT GET SICK FROM EATING                                     2
11607       001897 NO WEIGHT PROBLEMS                                                   1
11608       002896 NO ONE WOULD VOMIT OR CHOKE                                          2
11701       046852 NO MORE DISHES                                                      45
11702       066832 NO MORE KITCHENS                                                    66
11703       005893 NO MORE DINING ROOMS                                                 5
11704       042856 NO MORE COOKING PANS                                                42
11705       010888 NO MORE NEED FOR NAPKINS                                            10
11706       167731 NO STOVES                                                          167
11707       025873 NO DINING OR KITCHEN TABLES                                         24
11708       025873 NO CABINETS                                                         25
11709       053845 NO NEED FOR SILVERWARE                                              53
11710       002896 NO BAR                                                               2
11711       005893 NO CLOCK                                                             5
11712       011887 NO TABLE CLOTHS                                                     11
11713       001897 NO STRAWS                                                            1
11714       003895 NO FOOD SHELVES                                                      3
11715       003895 NO DISH CLOTHS                                                       3
11716       003895 NO MIXERS                                                            3
11717       004894 NO DISHWATER SOAP                                                    4
11718       018880 NO DISHWASHERS                                                      17
11719       002896 NO HIGH CHAAIRS                                                      2
11720       001897 NO POPCORN POPPERS                                                   1
11721       001897 NO APPLIANCES                                                        1
11722       003895 NO KITCHENS OR DINING CHAIRS                                         2
11723       001897 NO BREAD BOXES                                                       1
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11725        001897 NO NEED FOR A GRILL                                                    1    | A4
11726        001897 NO COOK WARE                                                           1
11727        002896 NO NEED FOR UTENSILS                                                   2
11728        001897 NO TOASTER                                                             1
11729        001897 NO HOT PLATES                                                          1
11800        002896 WE WOULD LIVE DIFFERENT                                                2
11901        077621 NO GARDENS                                                            76
11902        027071 NO GAINING WEIGHT                                                     27
11903        093805 NO NEED FOR MEAT PRODUCING ANIMALS                                    92
11904        029869 NO MORE FEELING OF HUNGER                                             29
11906        001897 WOULDNT HAVE TO CARRY HEAVY GROCERIES ANY LONGER                       1
11907        017881 NO NEED FOR FARMING                                                   17
11908        084814 NO SPECIFIC FOODS                                                     84
11909        002896 FOOD WOULD GO TO WASTE                                                 2
11920        003895 NO GREEN HOUSES                                                        2
11921        001897 NO IRRIGATION                                                          1
11922        033865 NO SEEDS                                                              33
11925        003895 WOULD NEED SOMETHING ELSE TO MAKE BODY ENERGY                          3
11926        002896 ONLY FLOWERS IN GARDENS                                                2
11927        022876 NO FARM ANIMALS                                                       22
11928        021877 NO HARVEST                                                            21
11929        021877 NO FRUIT TREES                                                        20
11920        001897 WOULDNT HAVE THE SAYING HOW THE COOKIES CRUMBLES                       1
11921        001897 FOOD SOURCES WOULD BECOME WILD                                         1
11922        001897 NO NEED FOR RAISING ANIMALS                                            1
11923        001897 NO OXYGEN FROM PLANTS                                                  1
20101      002 896 WATER PIPED FROM EAST                                                   2
20102      004 894 USE WATER FROM CACTUS                                                   4
20103      001 897 TURN SOME RIVERS AROUND                                                 1
20107      004 894 GET WATER FROM OCEAN                                                    4
20108      003 895 DIG A WELL                                                              3
20109      001 897 NEED TO DIG CANALS                                                      1
20120      001 897 DISCOVERIES THAT MAKE RAIN CLOUDS                                       1
20121      001 897 MORE RAIN DANCES                                                        1
20122      001 897 MORE WATER PURIFIER COMPANIES BUILT                                     1
20123      001 897 CARRY WATER THROUGH PIPES                                               1
20124      001 897 GET WATER FROM MOUNTAIN STREAMS                                         1
20201      001 897 MORE AIR CONDITIONERS                                                   1
20202      002 896 NO PLUMBERS                                                             2
20203      001 897 STOP MUCH TRADE                                                         1
20204      002 896 SALT LAKE DRY UP                                                        2
20205      001 897 WOOD WOULD ROT                                                          1
20207      001 897 NO SWANS IN WEST                                                        1
20208      002 896 NO LOGGING CAMPS                                                        3
20209      001 897 NO RODEOS                                                               1
20210      004 894 LESS AND NEW CLOTHES WORN                                               4
20211      002 896 BUILD OASIS IN WEST                                                     2
20212      004 894 NO SEASONS                                                              4
20223      002 896 NO BRIDGES, DAMS, CANALS                                                2
20214      001 897 ARABIAN HORSES IN WEST                                                  1
20215      004 894 NO MOVIES                                                               3
20216      001 897 GET BAD SUNBURN                                                         1
20217      001 897 NIGHTS COOLER, DAYS HOTTER                                              1
20218      001 897 NEED MORE SUN GLASSES                                                   1
20220      007 891 MORE SAND STORMS                                                        7
20221      002 896 NO DROWNING                                                             2
20222      016 882 POPULATION DROP IN US                                                  15
20223      001 897 LOGGERS WOULD STARVE                                                    1
20224      007 891 NO HOLLYWOOD                                                            7
20225      001 897 GOVERNMENT WOULD SAVE MONEY                                             1
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20226      013 885 CAMELS USED                                          11
20227      001 897 BUILD ARMY BASES IN EAST                              1
20228      001 897 INDIANS HAVE LAND BACK                                1
20229      005 893 GROUND BECOME CRACKED                                 5
20230      001 897 BUILD GIANT SAND CASTLES                              1
20231      005 893 NO BOATING                                            5
20232      007 891 VACATION SPOTS GONE                                   7
20233      001 897 GIANT SAND BOX                                        1
20234      011 887 GHOST TOWNS IN WEST                                  11
20235      006 892 NO ROADS                                              6
20236      014 884 FEWER PARKS                                          13
20237      014 884 DIRT BECOME SAND                                     14
20238      010 888 BEAUTIFUL LAND DESTROYED                             10
20239      003 895 COWBOYS HAVE NO JOBS                                  3
20240      015 883 MORE WASTELAND                                       15
20242      002 896 NO HOUSE BOATS                                        1
20243      004 894 NO IRRIGATION                                         5
20244      004 894 NO WATER FAUCETS, PIPES, PUMPS                        4
20245      001 897 NO WINTER OLYMPICS THERE                              1
20247      001 897 NO MORE ZOOS                                          1
20248      002 896 NO MISSISSIPPI RIVER                                  2
20249      002 896 SNOW MELT ON MOUNTAINS                                2
20250      013 885 NO FISHING OR HUNTING                                13
20251      007 891 DESERT ANIMALS LIVE THERE                             7
20253      001 897 SINUS SUFFERERS WOULD NOT LEAVE                       1
20255      001 897 HAVE A SAND FIGHT                                     1
20256      003 895 NO COATS, SLACKS, SOCKS, WINTER CLOTHES               4
20257      001 897 NO HEATERS                                            1
20258      005 893 LACK OF PRODUCTS                                      4
20259      002 896 ARABS WOULD LIVE THERE                                2
20261      001 897 NO GRAND CANYON                                       1
20262      005 893 NO TUBS, SINKS, BUCKETS                               5
20263      007 891 NO WATER POWER                                        7
20264      001 897 BLISTERS ON YOU                                       1
20266      001 897 OCEAN WOULD GO DOWN                                   1
20267      002 896 ATOM BOMB TESTING GROUND                              2
20268      001 897 YOU WOULD SEE CARAVANS                                1
20269      002 896 DISNEYLAND OUT OF BUSINESS                            2
20270      002 896 NO MOUNTAINS                                          2
20271      003 895 NO SKIING, SLEDDING, ICE SKATING                      3
20272      001 897 LAND WOULD BE DUST                                    1
20273      004 894 NO GOOD SOIL                                          4
20274      001 897 LIVE IN TENTS                                         1
20275      001 897 PEOPLE THERE FOR MINERALS                             1
20276      001 897 NO ARMY BASES THERE                                   1
20277      004 894 WEST NO LONGER FAMOUS                                 4
20278      001 897 WATER COSTS LOTS OF MONEY                             1
20279      001 897 NO RED WOOD TREES                                     1
20281      001 897 COULDNT ENJOY THE WEST                                1
20282      004 894 MORE FIRES                                            2
20283      005 893 FEWER STATES                                          5
20284      005 893 NO AIR POLLUTION IN CALIFORNIA                        5
20285      004 894 CANT MAKE WOOD HOUSES                                 4
20286      001 897 NO RAILROAD                                           1
20288      003 895 THINGS WOULD OVERHEAT                                 3
20289      001 897 NO LAWN MOWERS                                        1
20301      006 892 NOT ENOUGH JOBS                                       6
20302      002 896 HIGHER CRIME RATE IN EAST                             2
20303      013 885 NO SWIMMING POOLS                                    13
20304      002 896 MORE HIGHWAYS IN EAST                                 2
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20305      022 876 NOT ENOUGH FOOD                                                          22
20306      013 885 DISEASE INCREASE                                                         13
20307      001 897 EAST MAKE MORE MONEY                                                      1
20308      002 896 MORE FOOD GROWN IN EAST                                                   2
20310      001 897 MORE TRAFFIC IN N Y C                                                     1
20312      014 884 ANIMALS MOVE EAST                                                        14
20315      001 897 NO SAN FRISKO BAY                                                         1
20316      010 888 IN EAST NEEDED HOUSES,STORES,FARMS,SCHOOLS,HOSPITALS                     10
20317      004 894 MORE FACTORIES IN EAST                                                    4
20318      002 896 SWIMMING POOLS CROWDED                                                    2
20319      010 888 LACK OF ROOM FOR HOMES, SCHOOLS, FARMS                                    9
20320      010 888 LESS LAND PER OWNER                                                       9
20321      002 896 MORE PRODUCTION IN EAST                                                   2
20322      002 896 NEW FRIENDS AND HOMES                                                     2
20323      002 896 DOCTORS AND MEDICINE NEEDED                                               2
20324      001 897 SAND BLOWN EAST                                                           1
20325      002 896 LESS SPACE TO GROW FOOD                                                   2
20326      001 897 LACK OF CLOTHES                                                           1
20401      001 897 MEN COULDNT SHAVE                                                         1
20402      006 892 LOST OF MONEY                                                             6
20403      001 897 NO DRINKS LIKE KOOL-AIDE                                                  1
20404      004 894 PEOPLE LOSE JOBS                                                          4
20405      001 897 THINGS GO OUT OF BUSINESS                                                 1
20406      017 881 PEOPLE MOVE TO OTHER COUNTRIES                                           17
20407      001 897 EAT SEA FOOD                                                              1
20408      001 897 PLANES LAND ANYWHERE                                                      1
20409      004 894 NO BIG GAME IN WEST                                                       4
20410      001 897 NATION BECOME POOR                                                        1
20412      002 896 MORE IMPORTING DONE                                                       2
20413      001 897 RUSSIA WOULD TAKE OVER                                                    1
20414      001 897 AIRLINES OUT OF WORK                                                      1
20415      004 894 NOMADS WOULD LIVE THERE                                                   4
20416      003 895 MANY FUNERALS, KILLINGS, DEATHS                                           3
20417      001 897 WE WOULD BE CONQUERED                                                     1
20418      001 897 LESS OXYGEN                                                               1
20419      001 897 LESS FLOODS                                                               1
20420      001 897 PEOPLE EAT EACH OTHER                                                     1
20421      001 897 AMERICAN HISTORY WOULD BE DIFFERENT                                       1
20422      001 897 MORE GO TO CHURCH                                                         1
20423      002 896 HARD TO LIVE                                                              2
20424      001 897 ENDANGER THE ECONOMY                                                      1
20426      001 897 GOLDWATER OUT OF BUSINESS                                                 1
20427      001 897 LITTLE COMMUNICATION                                                      1
20428      001 897 NO RAIN BOW                                                               1
20429      001 897 NO LIFE GUARDS                                                            1
20430      001 897 NO WARS THERE                                                             1
20431      001 897 PEOPLE MOVE TO SHIPS                                                      1
20432      001 897 PEOPLE EXPLORE IT                                                         1
20501      009 889 NO SHADE IN WEST                                                          9
20502      210 688 ANIMALS WOULD DIE                                                       209
20503      049 849 PEOPLE WOULD MOVE                                                        50
20504      062 836 NO SPECIFIC ANIMALS                                                      62
20505      035 863 BE VERY HOT                                                              35
20506      022 876 NOTHING TO DRINK                                                         22
20507      025 873 NO TOWNS IN WEST                                                         25
20508      017 881 FOOD NEEDED                                                              17
20509      003 895 WATER WOULD EVAPORATE                                                     3
20510      037 861 NO HOUSES IN WEST                                                        37
20511      021 877 NO FARMS IN WEST                                                         21
20512      210 688 PLANTS WOULD DIE                                                        206
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20513     051 847 FEWER LAKES,RIVERS,PONDS                                           51   A7
20515     044 854 PEOPLE MIGHT DIE                                                   45
20516     102 796 GRASS WOULD DIE                                                   102
20517     030 868 NO RAIN IN WEST                                                    30
20518     011 887 NO BOATS, DOCKS, BOAT MOTORS                                       11
20519     020 878 NO CATTLE THERE                                                    20
20520     017 881 LOTS OF CACTUS IN WEST                                             17
20521     033 865 STARVATION                                                         33
20522     040 858 DIE FROM LACK OF WATER                                             40
20523     012 886 NO SCHOOLS THERE                                                   12
20524     001 897 NO GAS STATIONS                                                     1
20525     001 897 NO FISHING HOLES                                                    1
20526     019 879 NO FRUIT, VEGETABLES, OR MEAT                                      19
20527     080 818 COULDNT GROW CROPS                                                 80
20529     007 891 LESS FACTORIES                                                      7
20530     003 895 NO RANCHES                                                          2
20531     001 897 NO HOSPITALS                                                        1
20532     003 895 NO FURNITURE                                                        3
20533     005 893 NO STORES                                                           6
20534     006 892 NO BUILDINGS                                                        6
20535     002 896 NO NEED FOR HARBORS                                                 2
20536     003 895 HEAT WOULD KILL PEOPLE                                              3
20537     002 896 NO CHURCHES                                                         2
20538     001 897 NO WATER PUMPING STATIONS                                           1
20539     001 897 NO CATTLE RANCHES                                                   1
20540     006 892 WELLS WOULD GO DRY                                                  6
20541     001 897 CITIES WOULD CHANGE                                                 1
20542     006 892 NO FARMERS THERE                                                    6
20601     019 879 LOTS OF SAND                                                       19
20602     030 868 WATER NEEDED                                                       30
20603     029 869 COULDNT STAY CLEAN                                                 29
20604     018 880 NO VEHICLES IN WEST                                                18
20605     003 895 BE A CATASTROPHE, AWFUL                                             3
20606     021 877 NO SWIMMING                                                        21
20607     003 895 PEOPLE GO CRAZY                                                     3
20608     001 897 COULDNT USE MUCH WATER                                              2
20610     005 893 LESS TRANSPORTATION                                                 5
20611     005 893 COULDNT COOK                                                        5
20612     001 897 COULDNT WASH CLOTHES                                                1
20613     002 896 NO WATER FOR ANIMALS                                                2
20614     001 897 CANT GO MANY PLACES                                                 1
20701     001 897 WATER AND WOOD NEEDED FROM ELSEWHERE                                1
20702     001 897 GO TO SPACE                                                         1
20703     001 897 FIND WAY TO GET WATER                                               1
20704     006 892 MORE IRRIGATION                                                     6
20705     001 897 BUY MORE LAND                                                       1
20706     001 897 REBUILD THE WEST                                                    1
20801     052 846 LACK OF PEOPLE IN WEST                                             53
20802     014 884 POPULATION DECREASE IN WEST                                        13
20803     009 889 PEOPLE MOVE NORTH OR SOUTH                                          9
20804     027 871 CROWDED CITIES AND STATES                                          29
20805     116 782 OVERPOPULATED IN EAST                                             116
20806     001 897 COULDNT GET WATER                                                   1
30102     012 886 NO MORE SWIMMING                                                   11
30103     002 896 SURF AND SKATE BOARDS USED                                          2
30104     003 895 NEW CARS BUILT                                                      3
30105     001 897 CARTS TO MOVE IN                                                    1
30106     002 896 WOULD FLOAT                                                         2
30301     001 897 NEED LOWER HOUSES                                                   1
30303     003 895 LEGS WOULD GIVE OUT                                                 3
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30304      002 896 STRAPS EVERYWHERE                                   2
30306      001 897 SHELVES MADE LOWER                                  1
30307      001 897 ROBOTS USED                                         1
30308      001 897 PEOPLE NEED TO CHANGE                               1
30309      004 894 RAILS EVERYWHERE                                    4
30310      001 897 PEOPLE TAKE TO WATER                                1
30311      001 897 LOW DOOR KNOB                                       1
30312      001 897 PEOPLE NEED WINGS                                   1
30313      001 897 INVENT A HEAD PAD                                   1
30314      001 897 CLOTHES MADE WITH PADS                              1
30315      001 897 HEADS LOBSIDED                                      1
30316      001 897 USE FOR STORES IF STORES MOVED                      1
30317      002 896 THINGS PUT LOWER                                    2
30318      002 896 NEW KIND OF CHAIRS AND BEDS                         2
30319      001 897 LOW TABLES AND STOVES                               1
30401      024 874 STARVATION                                         23
30402      015 883 COULDNT READ OR WRITE                              15
30403      001 897 NO POINTED OBJECTS                                  1
30405      001 897 COULDNT WRITE AT BLACKBOARD                         1
30406      005 555 COULDNT SEE WELL                                    5
30407      015 883 NO GAMES PLAYED                                    14
30408      027 871 CANT GO TO SPECIFIC PLACES                         27
30409      004 894 DIE OF THIRST                                       3
30411      001 897 COULDNT DO HOMEWORK                                 1
30412      004 894 COULDNT EAT PROPERLY                                4
30413      001 897 LOSS OF COMMUNICATION                               1
30501      001 897 COULDNT TAKE SHOWER                                 1
30504      004 894 EVERYONE DIZZY                                      4
30505      003 895 COULDNT HUNT                                        3
30506      004 894 COULDNT CLEAN HOUSE                                 4
30507      002 897 COULDNT CARRY ANYTHING                              2
30508      003 895 GOOD POSTURE NOT NEEDED                             3
30509      001 897 COULDNT MOW LAWNS                                   1
30510      002 896 PEOPLELOSE MONEY                                    2
30511      001 897 HANDS BECOME PAWS                                   1
30513      010 888 COULDNT REACH HIGH THINGS                          10
30514      036 862 NO ACROBATS                                        38
30518      001 897 CENTER OF GRAVITY LOST                              1
30519      001 897 NO TALL DOORS NEEDED                                1
30520      001 897 HATS FALL OFF                                       1
30521      003 895 NO TRICK-OR-TREATING                                3
30523      001 897 COULDNT CARE FOR CHILDREN                           1
30524      010 888 COULDNT ATTEND JOBS                                10
30525      002 896 COULDNT FEED PETS                                   2
30526      002 896 DOCTORS MUST SIT                                    2
30527      001 897 NO ONE TALL                                         1
30528      003 895 COULDNT OPEN THINGS                                 3
30529      001 897 COULDNT CUT TREES                                   1
30590      001 897 PEOPLE FAINTING                                     1
30591      001 897 NO DEER SEASONS                                     1
30592      001 897 DOCTORS COULDNT OPERATE                             1
30593      001 897 NO PLAYGROUND                                       1
30534      001 897 NO STANDING JOBS                                    1
30595      005 893 LACK OF SPECIFIC JOBS                               5
30596      001 897 NO BALANCE BALLS ON NOSES                           1
30604      001 897 SOFT SIDEWALKS                                      1
30605      012 886 NO LEGS                                            12
30607      001 897 SKYSCRAPERS NEEDED                                  1
30610      002 896 WOULDNT NEED LADDERS                                2
30611      003 895 MORE DROWNING                                       3
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30612   001 897 COULDNT CROSS DEEP WATER                          1
30613   004 894 FEET NOT NEEDED                                   4
30614   001 897 MASS SIT-IN                                       1
30616   001 897 YOU WOULD SEEM DRUNK                              1
30617   001 897 ROBBERS GET MONEY ON GROUND                       1
30618   004 894 NO MORE WARS                                      4
30619   003 895 NO ACCIDENTS                                      3
30620   001 897 DIE OF SHOCK                                      1
30621   001 897 MORE PRAYING                                      1
30622   004 894 COULDNT GO UP IN SPACE                            4
30623   010 888 MORE DISEASES                                    10
30624   020 888 EVERYONE LIKE BABIES                             10
30625   001 897 LESS MURDERS                                      1
30626   001 897 SHORTAGE OF PEOPLE FOR JOBS                       1
30627   001 897 LESS VIOLENCE                                     1
30628   005 893 LESS FIGHTING                                     5
30629   001 897 NO TREE HOUSES                                    1
30630   001 897 PLAY STOOP TAG MORE                               1
30631   001 897 GOD WOULD DO AS HE WANTED                         1
30632   002 896 LACK OF MUSCLES                                   2
30633   001 897 LOSE THINGS FROM HANDS                            1
30634   002 896 COULDNT ROB BANK                                  2
30635   004 894 NO OLYMPICS                                       4
30636   001 897 EARTH TURNING FAST                                1
30637   001 897 COULDNT BURY DEAD                                 1
30638   001 897 COULDNT FIRE GUNS                                 1
30639   001 897 PEOPLE ALWAYS LATE                                1
30640   001 897 NO GAMES TO TOKYO                                 1
30641   001 897 NO MORE PARADES                                   1
30701   025 873 HOSPITALS CROWDED                                23
30703   104 794 SOME PEOPLE DIE                                 102
30704   004 894 EVERYONE DIRTY                                    4
30705   108 790 PEOPLE FALL AND GET HURT                        107
30706   024 874 BUMP INTO EACH OTHER                             25
30707   019 879 MORE DOCTORS, HOSPITALS, NURSES, NEEDED          19
30708   002 896 MORE AMBULANCES                                   2
30709   001 897 DOCTORS MAKE LOTS OF MONEY                        1
30710   001 897 MORE HOSPITAL BILLS                               1
30711   020 878 CAR WOULD BE WRECKED                             20
30712   007 891 PEOPLE GET RUN OVER                               7
30713   003 895 MEDICINE NEEDED                                   3
30714   003 895 HARD TO GO TO DOCTOR                              3
30715   001 897 SOME DIE OF HEART ATTACK                          1
30716   001 897 HOSPITALS MAKE MORE MONEY                         1
30717   001 897 AIRPLANES CRASH                                   1
30718   001 897 CHILDREN CRYING                                   1
30719   001 897 LOTS OF CASTS                                     1
30801   069 829 NO CARS, AIRPLANES, TRUCKS, BUSES                68
30802   004 894 NO TRAINS                                         4
30803   093 805 COULDNT DRIVE OR RIDE                            93
30804   018 880 COULDNT TRAVEL                                   17
30805   078 820 COULDNT RIDE BIKES                               76
30806   010 888 NO MORE TRANSPORTATION                           10
30807   010 888 COULDNT RIDE HONDAS                              10
30808   007 891 CANT RIDE PONIES                                  7
30809   004 894 NO MORE BOATING                                   4
30810   001 897 NO TRACTORS                                       1
30811   003 895 NO MORE AIRPLANE FLYING                           3
30812   001 897 NO SLEDS                                          1
30813   001 897 LESS GAS AND OIL NEEDED                           1
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30901      024 874 STAY IN BED                                                       24   A10
30902      017 881 CHAIRS NEEDED                                                     18
30903      026 872 LAY DOWN                                                          26
30904      008 890 EVERYONE BE CLUMSY                                                 8
30905      122 776 EVERYONE CRAWL                                                   120
30906      027 871 PEOPLE LYING EVERYWHERE                                           27
30907      010 888 GET MORE SLEEP                                                    10
30908      004 894 COOK ON FLOORS                                                     4
30909      001 897 PEOPLE LEAN ON STUFF                                               1
30910      003 895 PEOPLE WOULD ROLL                                                  3
30911      003 895 MORE BANDAIDS                                                      3
30912      003 895 NEW CLOTHES NEEDED                                                 3
30913      003 895 HOLD ONTO SOMETHING                                                2
30914      001 897 HAVE TO LOOK UP                                                    1
30915      002 896 NEED CLEAN RUG                                                     2
30916      001 897 STANDS NEEDED                                                      1
30917      001 897 LEAN ON EACH OTHER                                                 1
30918      002 896 MORE PILLOWS AND CUSHIONS                                          2
30919      001 897 MORE SOFT GRASS                                                    1
30920      001 897 CRAWLING RACES                                                     1
30921      001 897 TAKE LITTLE STEPS                                                  1
31001      029 869 NO SIDEWALKS                                                      29
31002      001 897 NO SHOE MAKERS                                                     2
31003      013 885 SHOES UNNECESSARY                                                 12
31004      007 891 NO ROADS                                                           7
31005      002 896 NO CONCRETE OR CEMENT                                              2
31006      004 894 NO WALKING ON SIDEWALKS                                            4
31007      004 894 PEOPLE BECOME LAZY                                                 4
31008      001 897 COULDNT GET TO BATHROOM                                            1
31009      001 897 FEET WOULDNT GET TIRED                                             1
31010      003 895 GET FAT                                                            3
31011      001 897 WEAR OUT GRASS                                                     1
31012      002 896 ROADS GROW UP WITH WEEDS                                           1
31013      002 896 CANT TAKE DOG FOR WALK                                             2
31014      002 896 NO SOCKS                                                           2
31015      001 897 FORGET HOW TO WALK                                                 1
31016      001 897 NO WALKING CLUBS                                                   1
31101      009 889 WE WOULD BE HELPLESS                                               9
31105      001 897 NO PEOPLE AFTER A WHILE                                            1
31108      007 891 TRAGEDY, DISASTER                                                  8
31111      007 891 WOULD BE FUNNY                                                     7
31112      001 897 WORLD NEED HELP                                                    1
31113      004 894 FUNN WORLD                                                         4
31114      014 884 PEOPLE GO CRAZY                                                   14
31115      002 896 HARD TO GO PLACES                                                  2
31116      002 896 PEOPLE ACT STUPID                                                  2
31117      004 894 PEOPLE KILL THEMSELVES                                             4
31118      001 897 THINGS NOT UNDERSTOOD                                              1
31119      009 889 SPECIFIC REACTIONS                                                 9
31120      001 897 MORE SORROW AND FEARS                                              1
31121      004 894 BE MISERABLE                                                       4
31122      001 897 BE AWKWARD WORLD                                                   1
31123      002 896 GET TIRED OF BEING DOWN                                            2
31124      002 896 MORE CARELESSNESS                                                  2
31125      002 896 A BIG MESS                                                         2
31126      002 896 HARD LIFE                                                          2
31127      002 896 NOT KNOW WHAT TO DO                                                2
31128      001 897 SOMETHING MUST BE DONE                                             1
31129      001 897 PEOPLE RESTLESS                                                    1
31130      002 896 LIFE BE DANGEROUS                                                  2
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31191     001 897 TIME WASTED                                1
31192     001 897 PEOPLE GET PANICKY                         1
31193     002 896 WOULDNT LIKE IT                            2
31194     001 897 PEOPLE LOSE PATIENCE                       1
31135     001 897 PEOPLE WANT TO DIE                         1
31136     002 896 NOTHING WOULD BE DONE                      2
31197     001 897 EVERYONE TRY TO GET IT BACK                1
31138     001 897 WOULD BE STRANGE                           1
31202     001 897 MORE KNEE PADS                             2
31204     008 890 COULDNT LIFT THINGS                        8
31205     012 886 MORE CRUTCHES                             12
31206     035 863 MORE WHEELCHAIRS                          35
31208     002 896 NEED FOR WALKERS                           2
31209     013 885 BREAK THINGS                              13
31210     004 894 NO FACTORIES                               4
31221     010 888 NO STORES                                 10
31212     001 897 NO SHOPPING CENTERS                        1
31223     001 897 THINGS SHUT DOWN                           1
31224     002 896 WOULDNT NEED TABLES                        2
31215     001 897 MORE STROLLERS                             1
31301     006 892 NO JUMPING ROPE                            6
31302     093 805 COULDNT EAT OR DRINK                      92
31304     017 881 NO FARMING                                17
31305     017 881 COULDNT BUILD THINGS                      16
31306     045 853 NO SPORTS                                 45
31307     023 875 MORE SITTING DOWN                         23
31308     006 892 BABIES COULDNT LEARN TO WALK               6
31309     010 888 COULDNT DANCE                             10
31310     001 897 NO SHOWS OF STUNTS                         1
31311     001 897 NO DANCERS OR ACTORS                       1
31312     002 896 NO BUSINESS MAN                            1
31313     047 851 COULDNT RUN, SKIP, KICK                   46
31314     003 895 COULDNT PUT CLOTHES ON                     3
31315     001 897 CANT COMB HAIR                             1
31316     001 897 COULDNT GET IN BED                         1
31317     002 896 COULDNT EXERCISE                           2
31318     007 891 NO GARDENS                                 7
31319     002 896 STAY HOME ALL DAY                          2
31320     001 897 NO TRAMPOLINES                             1
31321     006 892 COULDNT CLIMB                              6
31322     001 897 NO SPORTING EQUIPMENT                      1
31323     001 897 NO ATHLETES                                1
31324     002 896 COULDNT WORK                               2
31325     001 897 COULDNT STAND ON HEAD                      1
31326     001 897 COULDNT ANSWER PHONE                       1
31327     001 897 LACK OF PHYSICAL HEALTH                    1
31328     002 896 HARD TO FIX MEALS                          2
31329     001 897 COULDNT USE TEETER TODERS                  1
31330     001 897 NO STANDING UP ACTIVITIES                  1
31331     001 897 NO CHASE ON FOOT                           1
40101     001 897 USE OF SIGNS                               1
40103     001 897 MEMORIES IMPROVED                          1
40104     001 897 READ AS BLIND PEOPLE                       1
40105     001 897 PUSH BUTTON WORKERS NEEDED                 1
40201     001 897 NO FREEDOM OF PRESS                        1
40203     011 887 NO BANKS                                  11
40204     044 854 NO MONEY                                  44
40205     006 892 NO PLAYS                                   6
40206     007 891 NO TAXES                                   7
40208     008 890 NO PAPER ROUTES                            8
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40209        021 877 NO BILLS                                                                          21    A12
40210        003 895 NO WATCHES                                                                         3
40211        005 893 NO POSTERS                                                                         5
40212        001 897 NO ARCHEOLOGISTS                                                                   1
40213        001 897 NO REPORTERS                                                                       1
40214        012 886 NO CALENDARS                                                                      12
40215        001 897 NO SENATE                                                                          1
40216        003 895 NO INSURANCE                                                                       3
40217        015 883 NO LAWS OR LAWYERS                                                                15
40218        003 895 NO TELEPHONE BOOK                                                                  3
40219        007 891 COULDNT FLY PLANES                                                                 7
40220        007 891 GET WRONG FOOD                                                                     6
40221        001 897 NO INSTRUMENT LESSONS                                                              1
40222        006 892 NO MOON TRIPS                                                                      5
40223        020 878 NO LABELS ON THINGS                                                               20
40225        001 897 STOCK PRICES GO DOWN                                                               1
40227        006 892 NO CONTRACTS                                                                       6
40228        001 897 NO SHEET MUSIC                                                                     1
40229        006 892 NO CHECKS                                                                          6
40230        012 886 NO ADVERTISEMENTS                                                                 12
40231        001 897 NO BILLFOLDS                                                                       1
40232        010 888 NO TIME                                                                           10
40233        002 896 LESS CARS                                                                          2
40234        002 896 NO MORE VOTES                                                                      2
40235        006 892 COULDNT MAKE THINGS                                                                6
40236        001 897 NO BLUEPRINTS                                                                      1
40237        001 897 NO BIRTH CERTIFICATES                                                              1
40238        001 897 NO ASTRONAUTS                                                                      1
40239        003 895 NO SCIENTISTS                                                                      3
40240        001 897 NO SCHOLARS                                                                        1
40241        001 897 NO RENT                                                                            1
40242        001 897 NO STOCK EXCHANGE                                                                  1
40243        002 896 NO NEWS PAPER PRESSES                                                              2
40244        001 897 NO TREATIES                                                                        1
40245        001 897 NO RECEIPTS                                                                        1
40301        008 890 NO GLASSES NECESSARY                                                               8
40303        006 892 NO FAMOUS WRITERS                                                                  6
40304        005 893 NO TYPEWRITERS                                                                     5
40305        013 885 COULDNT FINISH THIS TEST                                                          13
40307        001 897 NO GREAT SPEECHES GIVEN                                                            1
40308        001 897 TAPE RECORDED BOOKS                                                                1
40309        014 884 NO SECRETARIES OR OFFICE WORK                                                     15
40310        005 893 NO LIBRARIANS                                                                      5
40311        001 897 NO BOOK CARDS                                                                      1
40312        003 895 TELEGRAPH WOULD STOP                                                               3
40313        002 896 NO PENCIL SHARPENERS                                                               2
40314        004 894 NO PEN PALS                                                                        4
40315        004 894 NO BUSINESS OFFICES                                                                4
40316        001 897 NO TEST PAPERS                                                                     1
40317        005 893 NO REPORT CARDS                                                                    5
40320        001 897 NO BOOK MARKS                                                                      1
40321        001 897 NO PAPER CUTTERS                                                                   1
40503        002 896 EAT POISON BY MISTAKE                                                              2
40504        001 897 SMARTER PEOPLE SLAVE US                                                            1
40505        001 877 MORE SPORTS                                                                        1
40506        001 897 THIEVES ROAM COUNTRY                                                               1
40602        018 880 MORE ACCIDENTS                                                                    18
40603        003 895 ANOTHER DARK AGES                                                                  3
40605        001 897 MORE SALESMEN                                                                      1
40606        002 896 NO POLICE TICKETS                                                                  2
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40607      003 895 GET CHEATED BY LAND SELLERS                                     3
40608      001 897 NO SIGNING FOR FOOTBALL                                         1   A13
40609      001 897 COULDNT READ NAMES OF SONGS                                     1
40610      015 883 NO STORIES                                                     15
40611      001 897 COULDNT TELL SCORE IN BOWLING                                   1
40612      001 897 NO SORE FINGERS FROM WRITING                                    1
40613      005 893 WOULDNT USE GOOD ENGLISH                                        5
40614      001 897 COULDNT GO TO OTHER COUNTRIES                                   1
40615      001 897 COMMERCE WOULD DROP                                             1
40616      029 869 NO MAILMAN                                                     29
40617      007 891 WOULDNT KNOW WHERE TO GO                                        7
40618      003 895 NO SPEED LIMIT                                                  3
40619      002 896 NO USE FOR DRIVERS TEST                                         2
40621      001 897 WOULDNT KNOW RIGHT MEDICINE TO TAKE                             1
40622      003 895 NO READING CLASS                                                2
40623      001 897 COULDNT IDENTIFY BELONGINGS                                     1
40624      003 895 NO WRITING CLASS                                                2
40625      001 897 BOOKS BE ANTIQUES                                               1
40626      001 897 PRESIDENT COULDNT SIGN BILLS                                    1
40627      001 897 NO STORYTOWN                                                    1
40701      004 894 NO BOOKS PUBLISHED                                              4
40702      008 890 DECLINE IN SALE OF PAPER                                        8
40703      011 887 NO ERASERS                                                     11
40704      121 777 NO PENCILS OR PENS                                            120
40705      001 897 NO MAGAZINE RACKS                                               1
40706      004 894 NOT KNOW ABOUT BOOKS                                            4
40709      004 894 NO NOTEBOOKS                                                    4
40710      002 896 NO STAMPS                                                       2
40711      003 895 NO POST CARDS                                                   3
40712      001 897 NO ENVELOPES                                                    1
40713      008 890 NO CHALK                                                        8
40714      001 897 NO BIRTHDAY CARDS                                               1
40715      003 895 NO RULERS                                                       3
40716      003 895 NO BOOK STORES                                                  3
40801      005 893 NO RECORDED HISTORY                                             5
40802      006 892 DECREASE IN COMMUNICATION                                       6
40803      035 863 END OF POSTAL SYSTEM                                           32
40804      075 823 NO SIGNS OR MAPS                                               72
40805      002 896 NO GRADES IN SCHOOL                                             1
40806      001 897 COULDNT WORK PROBLEMS                                           1
40807      010 888 NO WRITTEN RECORDS                                             10
40810      002 896 NO LICENSE                                                      2
40811      001 897 COULDNT READ NAMES OF TOWNS                                     1
40812      001 897 MIGHT FORGET ALPHABET                                           1
40813      004 894 NO WRITTEN REPORTS                                              4
40814      002 896 NO GLOBES                                                       2
40815      001 897 NO MENU                                                         1
40816      001 897 NO NAMES ON MAIL BOXES                                          1
40817      004 894 NEWS WOULD DECREASE                                             4
40901      058 840 MORE RADIOS                                                    55
40902      005 893 TELEPHONES USED MORE                                            5
40903      005 893 TALKING ALL THE TIME                                            5
40904      003 895 HAVE TO LISTEN                                                  3
40905      001 897 RECORD PLAYERS INCREASE                                         1
41001      001 897 DECAY OF CIVILIZATION                                           1
41002      007 891 BUSINESS FAILURES                                               7
41005      007 891 DO MORE DRAWING                                                 7
41006      001 897 EVERYTHING GO TO WASTE                                          1
41007      002 896 HAVE TO START OVER AGAIN                                        2
41008      003 895 PEOPLE IN CONFUSION                                             3
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41009     002 896 USE SIGNALS                                                        2
41010     003 895 BE A BIG MESS                                                      3
41011     002 896 NO MODERN THINGS                                                   2
41012     001 897 UNORGANIZED GOVERNMENT                                             1
41013     004 894 BOOK COMPANIES FAIL                                                3
41015     005 893 PAPER FACTORIES FAIL                                               5
41016     002 896 PENCIL FACTORIES FAIL                                              2
41017     003 895 NEWSPAPER BUSINESS FAIL                                            3
41018     004 894 PEOPLE GO CRAZY                                                    4
41021     001 897 NO PRINT SHOPS                                                     1
41101     003 895 NEW LANGUAGE NEEDED                                                4
41102     036 862 LESS JOBS                                                         34
41103     019 879 NO ALPHABET                                                       20
41104     234 664 NO BOOKS                                                         230
41105     022 876 NUMBERS NOT NEEDED                                                22
41106     008 890 GET LESS MONEY                                                     8
41108     100 798 COULDNT READ SPECIFIC THINGS                                      98
41109     064 834 COULDNT WRITE SPECIFIC THINGS                                     64
41110     009 889 NO BLACK BOARDS                                                    8
41111     016 882 NO SPELLING                                                       16
41112     001 897 LOSE FRIENDS                                                       1
41113     012 886 NO CLOCKS                                                         11
41114     025 873 NO SCHOOLWORK                                                     25
41115     007 891 PLAY MORE                                                          7
41116     014 884 MORE TV WATCHING                                                  13
41117     001 897 NO SPORTS PAGE                                                     1
41118     001 897 NO TEACHER GETTING NOTES                                           1
41119     001 897 NO CATELOGUES                                                      1
41120     016 882 NO COMICS                                                         16
41121     006 892 NO REFERENCES                                                      6
41122     006 892 NO MESSAGES                                                        6
41123     001 897 TV PEOPLE MAKE MONEY                                               1
41125     008 890 NO NOTES                                                           8
41126     004 894 NO BILL BOARDS                                                     3
41127     003 895 BULLETINS OR BOARDS                                                3
41128     002 896 MORE MOVIES                                                        2
41129     001 897 NO TV GUIDE                                                        1
41130     002 896 NO BIBLE                                                           2
41131     001 897 MORE TIME FOR OTHER THINGS                                         1
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APPENDIX B. The Test Battery

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THE TEST BATTERY

1. Gestalt Transformation (Redefinition)

Select one of the five alternative objects, or parts of objects, to be used to serve a stated purpose. A sample item reads: TO LIGHT A FIRE. 1. Cabbage, 2. Fish, 3. Pocket watch, 4. String, 5. Pipe stem. Answer: Pocket watch (use cover as condensing lens). Parts, 1. Items, 10. Working time, 8 min.

Guilford's factor NMT semantic redefinition (convergent production of semantic transformations).

2. Alternate Uses (Flexibility)

List as many as six uses for an object, such as a newspaper, other than the common use, which is stated. Parts, 2. Items, 3 per part. Working time, 8 min.

Guilford's factor DMC semantic spontaneous flexibility. Divergent Production of semantic classes. A revision of his Unusual Uses Test.

3. Plot Titles (Originality-clever)

Write titles for a short story; only clever titles being accepted. Parts, 2. Items per part, 1. Working time, 6 min.

Guilford's factor DMT - Originality (semantic adaptive flexibility) Divergent Production of semantic transformations.

4. Seeing Problems (Sensitivity)

List as many as five different problems connected with a common object. Score consists of all problems dealing with the structure, use or operation of the object. Parts, 2. Items per part, 3. Working time, 8 min.

Guilford's EMI, (Sensitivity). Evaluation of semantic implications.

5. Consequences - Remote Score (Originality-remote)

Give remote (distant in time or in space or in sequence of events) consequences for a specified event. Parts, 4. Items per part, 1. Working time, 8 min.

Guilford's DMT (semantic adaptive flexibility). Divergent production of semantic transformations.

6. Consequences - Total Score (Ideational Fluency)

List consequences of a proposed unusual event. Parts, 4. Items per part, 1. Working time, 8 min. Score is total of obvious and remote responses.

Guilford's DMU (ideational fluency). Divergent production of semantic units.